PIONEER

Service Manual

The photo shows the model KE-6100.

ORDER NO.
CRT-245-0

CASSETTE CAR STEREO WITH AM/FM ELECTRONIC TUNER

KE-5100

US, CA

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Subject: KE-5100
For Cassette Mechanism, refer to the Service Manual of unit number CX-100A/P.
KE-6100
For Cassette Mechanism, refer to the Service Manual of unit number CX-100A/N.

- 'Dolby' and the double-D symbol are trademarks of Dolby Laboratories Licensing Corporation.
- Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.

SPECIFICATIONS

General

Power source ..... DC14.4V (10.8 ~ 15.6V allowable)
Grounding system ..... Negative type
Dimensions (chassis) ..... 180(W) × 50(H) × 150(D) mm
(7-1/8(W) × 2(H) × 5-7/8(D) in.)
(nose) ..... 105(W) × 45(H) × 30(D) mm
(4-1/8(W) × 1-3/4(H) × 1-1/8(D) in.)
Shaft interval ..... 147 mm (5-3/4 in.)
Weight ..... 1.7 kg (3.7 lbs.)

Amplifier

Continuous power output is 2.9W per channel min. into 4 ohms, both channels driven 50 to 15,000 Hz with no more than 5% THD.
Maximum power output ..... 6W + 6W
Load impedance ..... 4Ω (4 ~ 8Ω allowable)
Loudness contour ..... + 12 dB (100 Hz), + 4 dB (10 kHz)
(volume: − 30 dB)

Tape Player

Tape ..... Compact cassette tape (C-30 ~ C-90)
Tape speed ..... 4.76 cm/sec.
(+ 0.19 cm/sec. − 0.05 cm/sec.)
Fast forward/rewind time ..... Within 100 sec. for C-60
Wow & flutter ..... No more than 0.15% (WRMS)
Frequency response
..... 50 ~ 16,000 Hz (± 3 dB) (at metal) (KE-6100)
50 ~ 12,000 Hz (± 3 dB)
Stereo separation ..... More than 45 dB
Signal-to-noise ratio
..... Dolby NR IN: More than 60 dB (KE-6100)
(IHF-A network, at 1W)
Dolby NR OUT: More than 52 dB (KE-5100/6100)
(IHF-A network, at 1W)

FM Tuner

Frequency range ..... 87.9 ~ 107.9 MHz
Usable sensitivity ..... 16.8 dBf (1.9μV/75Ω, mono)
50 dB quieting sensitivity ..... 19.2 dBf (2.5μV/75Ω, mono)
Alternate channel selectivity ..... 70 dB (± 400 kHz)
Distortion ..... 0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response ..... 50 ~ 12,000 Hz (± 3 dB)
Stereo separation ..... 40 dB (at 65 dBf, 1 kHz)

AM Tuner

Frequency range ..... 530 ~ 1,620 kHz
Usable sensitivity ..... 30μV (29.5 dB) (S/N: 20 dB)
Selectivity ..... 50 dB (± 10 kHz)

These specifications were determined and are presented in accordance with specification standards established by the Ad Hoc Committee of Car Stereo Manufacturers.

Note:
Specifications and the design are subject to possible modification without notice due to improvements.

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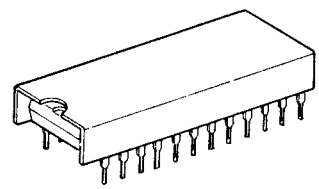
CAUTION
When Handling IC PD7003
Please Observe:
IC PD7003 (IC9 in the control printed circuit board) is C-MOS IC of extremely low power consumption and very high input impedance. Unless handled with special care, they could be damaged by static electricity induction. This IC is supplied with a shorting cap (of aluminum foil) attached. When soldering or performing other repair work, always attach this cap as shown below. Remove the cap after the repair has been completed.
Also, this type IC must not be inserted in a polystyrene package for storage.



1. PARTS LOCATION

The photo shows the model KE-6100.

NOTE:

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
  ★ ★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

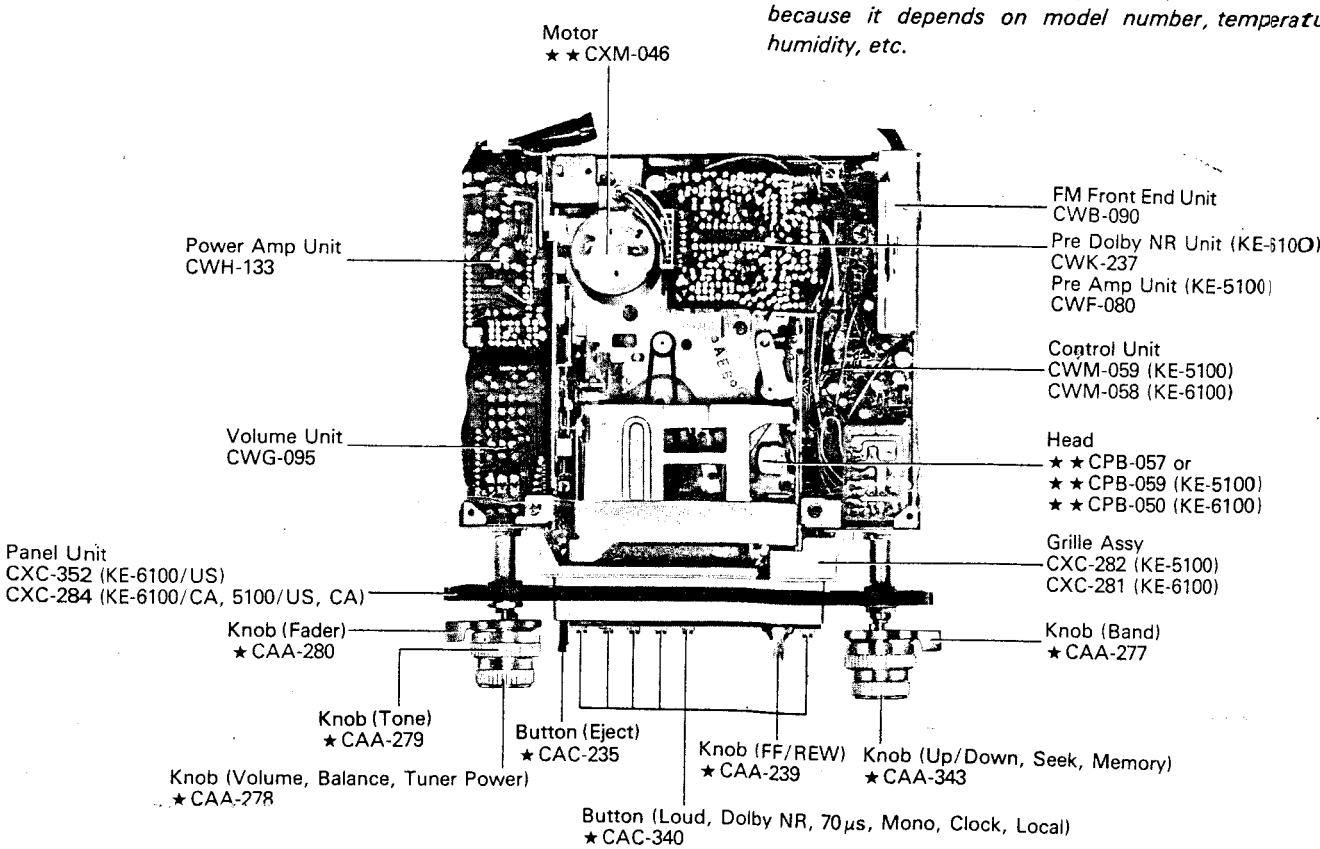


Fig. 1

2. CIRCUIT DESCRIPTION

• **Block Diagram**

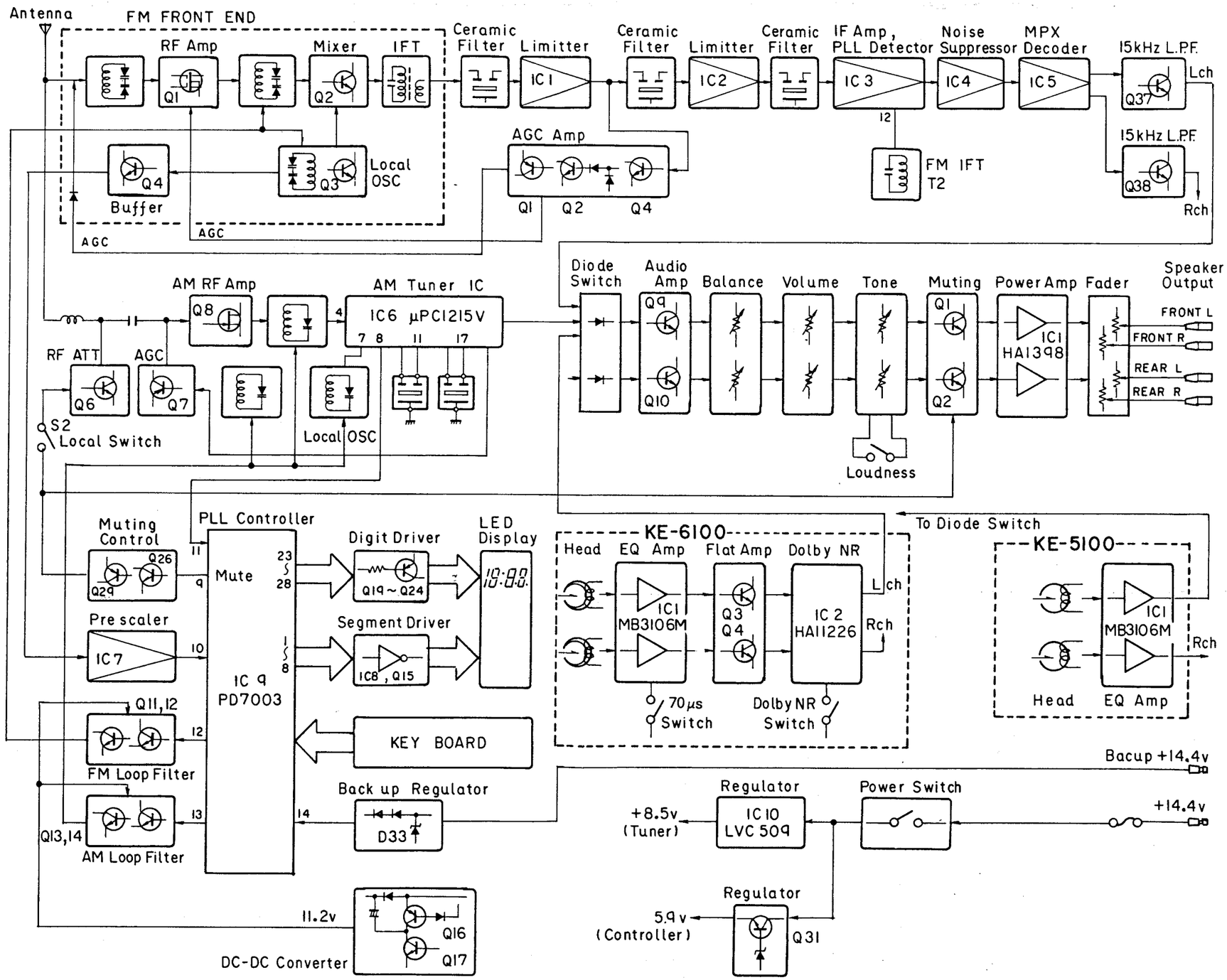


Fig. 2

• Level Diagram

KE-5100

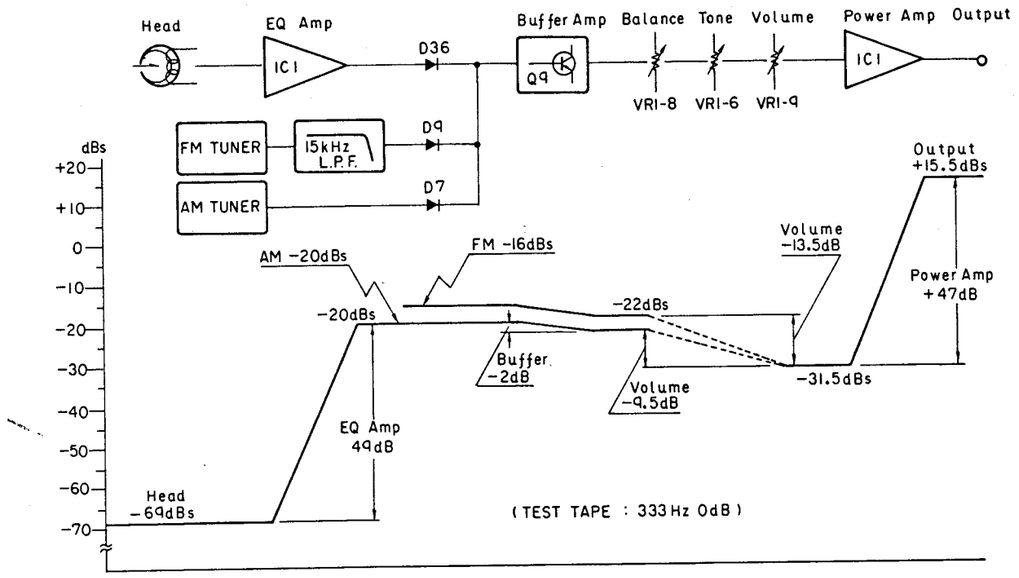


Fig. 3

KE-6100

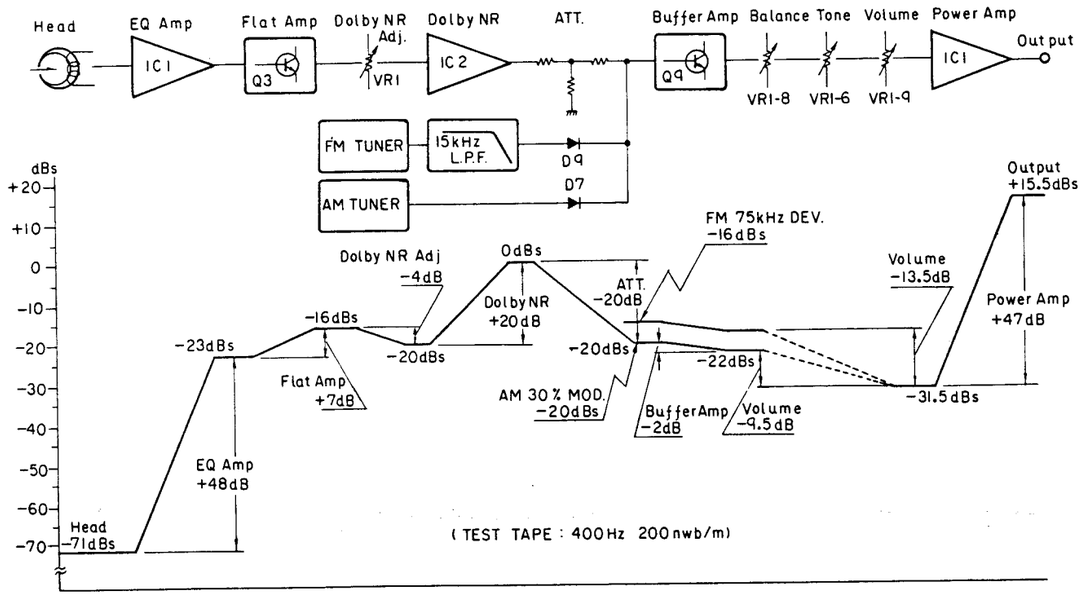


Fig. 4

2.1 TAPE SECTION

• Equalizer Amplifier

An MB3106M dual-type IC is employed in the equalizer amplifier.

• Tape Selector Circuit (KE-6100)

There are many types of cassette tapes: normal tapes, chrome tapes and the more recent metal tapes. Trends in tapes are toward an improved signal-to-noise ratio and an extended dynamic range, and even with car stereos, it has become necessary to cater to both chrome tapes and metal tapes.
When a metal or chrome tape is played back on a deck designed for normal tapes, the recording equalizer time constant is recorded not at 120μs but at 70μs, and so the sound appears higher than it actually is.
To compensate for this, a tape selector is provided to select between the normal tape position and the chrome tape position by switching the playback equalizer time constant between 120μs and 70μs.
When this switch is set to the normal tape position (70 μs switch is OFF), the output level falls as the frequency rises from about 50 Hz (3180 μs) at −6 dB/oct, and when the frequency rises above the 1.3 kHz (120 μs) level, the level becomes constant—this is the NAB curve (Fig. 5). Usually, when playing back a normal tape, the frequency response is flat. But when a chrome tape or a metal tape is played back with this switch at the normal position, the high frequency range response rises several dB.
When the switch is set to the chrome tape position (70 μs switch is ON), the low-frequency range response is the same as that for the normal position but the level drops around a frequency of about 2.3 kHz (70 μs) at −6 dB/oct, and once the frequency exceeds this value, the level becomes constant. When a chrome tape or a metal tape is played back, the frequency response becomes flat. When playing back a normal tape in the chrome position, the high frequency range response falls several dB.

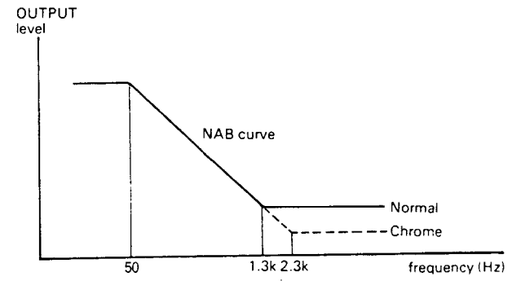


Fig. 5

• Dolby NR Circuit (KE-6100)

The Dolby NR system functions to reduce the amount of tape hiss and expand the dynamic range of the high frequencies. It is able to improve the S/N ratio by 10 dB.
When the Dolby NR switch is at the OFF position, the Dolby NR circuit functions as a flat amplifier, thereby allowing tapes which have not been recorded with the Dolby system to be played back.
The Dolby NR switch is set to ON when playing tapes which have been recorded with the Dolby NR system.

When the switch is at OFF, +B is applied to the base of transistor Q5 which then turns off since it is a PNP type. Since the signal components no longer pass through the highpass filter, the circuit functions as an ordinary flat amplifier.
When the Dolby NR switch is at ON, +B is no longer applied to the base of transistor Q5 which then turns ON. +B is applied to the Dolby NR indicator which lights. Since Q5 is ON, the high-pass filter is connected to the output and the Dolby noise reduction effect is produced.

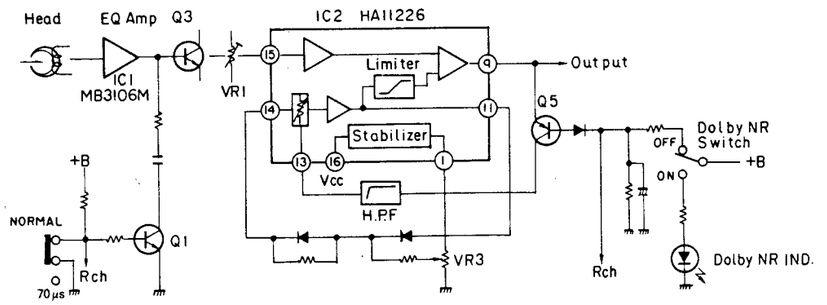


Fig. 6

2.2 TUNER SECTION

• Front End

The front end features a single-stage RF amplifier based on a dual-gate MOS FET and a tuning circuit using a twin-configured 3-gang variable capacitor. The excessively high signal input levels are dealt with by the first AGC circuit using an AGC pin diode in the input circuit and by the second AGC circuit that varies the second gate voltage of the dualgate MOS FET.
The local oscillation signal is sent to the synthesizer circuit, it is compared with the reference signal, the difference between the two signals is supplied to the variable capacitor as the control voltage and the oscillation frequency is determined.

• IF Amplifier, Detector Circuit

The front end output signal and IF signal are sent to the following circuits: ceramic filter → limiter amp → ceramic filter → limiter amp → ceramic filter → IF amp and detector IC (PA4007). They are amplified and detected. PLL detection is used.

• Pulse Noise Suppressor (PNS)

The noise components included in the detected signal are detected, the gate is opened only for the duration of the noise and the signal is cut out.

• MPX Decoder

The MPX IC (LA3370P) is composed of a PLL subcarrier generator circuit, switching demodulator, automatic stereo/mono selector circuit, stereo indicator lighting circuit, separation control circuit and high-range attenuation circuit.

• Low-Pass Filter (LPF)

This 15 kHz LPF serves to cut out the 19 kHz and 38 kHz components that leak from the MPX decoder.

• AM Tuner

The AM tuner section employs a μPC1215V IC for AM.
The signal, which has been amplified by the first-stage junction FET, is mixed, IF amplified and detected by the μPC1215V IC and a low-frequency output signal is produced. Automatic gain control (AGC) for reducing the output variations caused by fluctuations in the signal strength is forcefully exercised by the AGC transistor connected directly to the antenna input circuit in addition to the AGC circuit inside the IC.
The tuning circuit features a 3-gang configuration with three variable capacitors. The local oscillation signal is sent to the synthesizer circuit, it is compared with the reference signal, the difference between the two is applied to the variable capacitors as the control voltage and the oscillation frequency is determined.

• Regulator

The 8.5 V power supply for the tuner is regulated by the special regulator power supply IC, LVC509, to produce a highly accurate power supply with suppressed ripple.
The power is sent to the FM front end, IF circuit, MPX circuit and AM tuner circuitry.
The 5 V power supply for the control circuitry uses a circuit combining a zener diode with transistors, and when the power is supplied to the PD7003 control IC, it also serves as the supply for the display LED.

2.3 MUTING CONTROL CIRCUIT

This circuit functions to control the muting circuit installed in the low-frequency output circuit, and it is composed of a kind of monostable multivibrator. When it is activated by the muting signal from the controller or the muting signal from the tape section and when the power is switched on and off, the circuit generates a muting signal.
Muting takes place in the following cases when:

1. The power is switched on and off.
2. The tape is loaded or ejected.
3. Tuning is performed with the manual, scan or seek methods.
4. The contents of the memory are recalled.
5. The band is selected.
6. The tape is fast forwarded or rewound.

2.4 FUNCTIONS OF PD7003 CONTROL IC

• PLL Section

Fig. 7 shows the FM mode status of the PLL configuration. After the frequency signal from the VCO (FM front end local oscillator) is amplified (by buffer amp Q4) as the f_{VCO} signal, it is divided (1/20) by IC7 μPB552C and the output enters pin 10 of IC9 PD7003. It is then divided again (1/2) and it enters the programmable divider which divides the frequency with a set ratio. In addition, the 4.5 MHz signal serving as the PD7003 clock signal is divided (1/900) down to 5 kHz as the reference frequency (f_r), it passes through the phase comparator (PC) and charge pump and a pulse with a 5 kHz frequency as the reference is fed out from IC pin 12. This output is converted into DC by the loop filter (composed of Q11 and Q12) to serve as the tuning voltage which is applied to pin 7 of the FM front end unit, the ANT, RF and VCO are controlled and the reception mode is held. If symbols are used to represent the above process, the result is as follows:

$P \times f_r$ signifies the channel spaces. In the AM mode, pin 8 of IC6 μPC1215V serves as the VCO buffer amplifier output, the signal enters pin 11 of PD7003 and then enters the programmable divider directly without passing through the prescaler. f_r is set at a 10 kHz frequency and a pulse with a frequency of 10 kHz as the reference is fed out from pin 13 of PD7003, it passes through the loop filter consisting of Q13 and Q14 and the AM ANT, RF and VCO are controlled. The formula relating to the AM mode is, therefore:

$$f_{VCO} = Nf_r$$

f_r signifies the channel spaces.

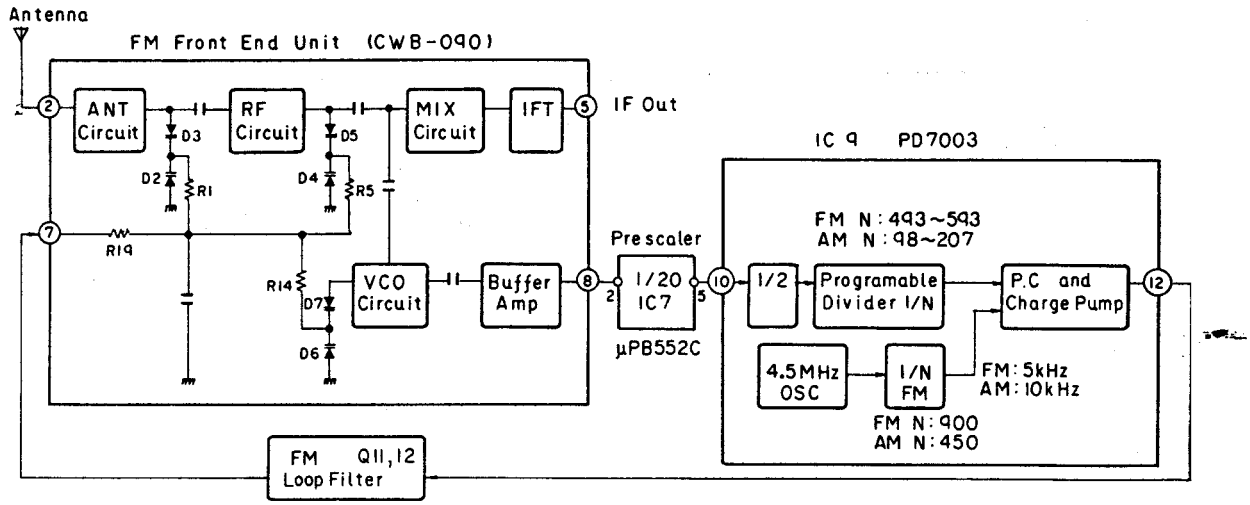


Fig. 7

• Display Control Section

A dynamic lighting system is used for the PD7003 display which is performed in the D1 ~ D6 periods where one period is approximately 3 msec. This signifies the digits of the display section and the elements are composed so that indication is provided by signals S1 ~ S8. D5 and D6 make it possible to display the band and channel. D1 ~ D6 are "L" active while S1 ~ S8 are "H" active. Fig. 8 is a simplified figure of the display peripheral circuits.

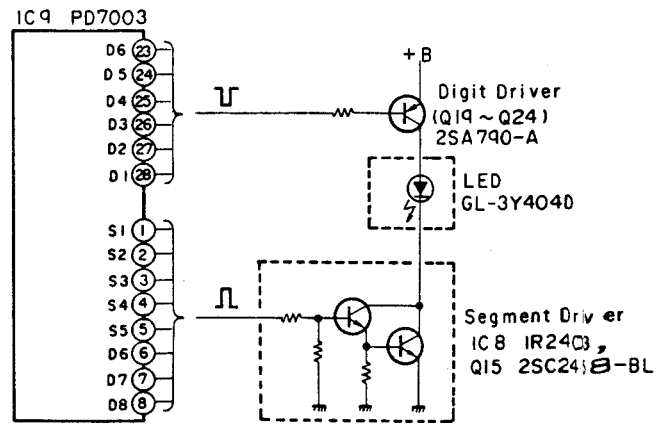


Fig. 8

• Switch Matrix

As shown in Fig. 9, the touch-type switches and tuning switches are each grouped together on the front panel. The operations of the diodes and transistor are now described.
The five diodes, D24 ~ D27 and D34, are designed to safe-guard against malfunctions caused when the touch-type switches are depressed twice.
D19 and D28 serve the same purpose.
The four transistors—Q25, Q27, Q28 and Q30—function as transistor switches when the control voltage is applied to each transistor base via the resistances. In particular, the diode switch connected at D19 is installed so that the channel spaces in the USA AM band can continue to be set at 10 kHz and when these spaces are changed to 9 kHz, all that need be done is isolate the D19 diode.
The "A/B" of the switches signifies that "A" is ON and "B" is OFF, and at places where there are transistor switches + B is applied to the base during the ON mode. Pins 23 ~ 28 serve as the digit pins which are "L" active types while pins 19 ~ 22 have built-in pull-up resistors. If the switches are OFF, pins 19 ~ 22 are in the "H" state. When one of the switches is set to ON, one of the 19 ~ 22 pins goes to "L" with the digit timing, PD7003 judges which switch has been depressed and it moves into the operation.

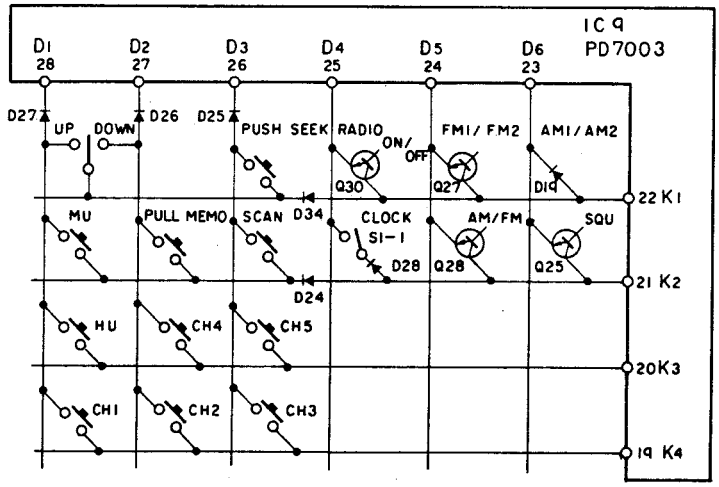


Fig. 9

• Scan Operation

When the SCAN key is depressed with the radio on at the FM 1 position (with Q30 and Q27 ON and Q28 OFF), PD7003 is set to the SCAN mode and the frequency division ratio N of the programmable divider increases one step at a time during a fixed time period.
Due to the phase-locked loop configuration the tuning voltage also rises and the reception frequency moves up the frequency scale. The absence or presence of broadcasting stations is identified by PD7003 which judges whether or not Q25 has turned ON with every 1-step change, and N is stopped from changing. In other words, the scanning operation can be stopped by turning Q25 ON when a station has been picked up.
In Fig. 10, pin 11 of IC3 PA4007 serves as an open collector output which is open for the width of the station (f_d) ± 40 kHz, and Q25 has been turned ON through R143, D40 and R146. Similarly at the AM position (Q30 and Q28 are ON and Q27 is OFF) IC6 μPC1215V is an open collector output with pin 19 open for the narrow-band width (f_d ± 5 kHz) of CF4 and CF5 in the schematic diagram, and Q25 is turned on through R144, D39 and D146.

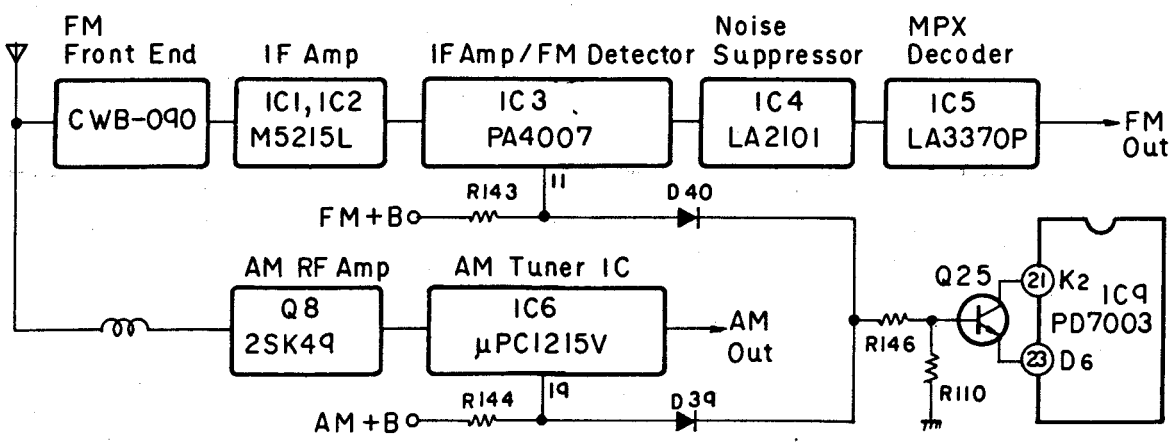


Fig. 10

• DC-DC Converter

When the battery voltage has dropped, a voltage of approximately 11.2 V is provided from the tuner 8.5 V power supply to power the loop filter circuit used to generate the tuning voltage. This is to prevent the tuner's tuning frequency from changing. The digit signals fed out from the control IC PD7003 are used as the switching signals, and a voltage doubler circuit is configured combining the transistor switches and electrolytic capacitors.

Fig. 11 shows a simplified view of the DC-DC converter and also a description. D13, D14, Q16 and Q17 are switching diodes and transistors and D13 and D14 are driven by drive transistor Q18. D1, D3 and D5 digit signals are applied to the base of this transistor and a virtually square wave signal is produced by the D16~D18 diode OR circuit. As a result, Q18 repeatedly turns ON and OFF and so Q16 and Q17 turns ON and OFF alternately. This result is now detailed using the description figure. First, in the switch circuit indicated by the solid line, the situation is the same in equivalent terms as when Q17 turned ON, the current from power supply E passes through D14 and C84 is charged.

Next, when Q16 turns ON (in the case of the dotted line), the voltage of power supply E and the charging voltage of C84 are connected in series, they pass through D13 and exactly double the E voltage is charged in C78. In the next period, D13 turns OFF so that the C78 charging voltage does not flow back, C84 is charged (solid line) through D14, C84 and Q17, and the whole operation is repeated.

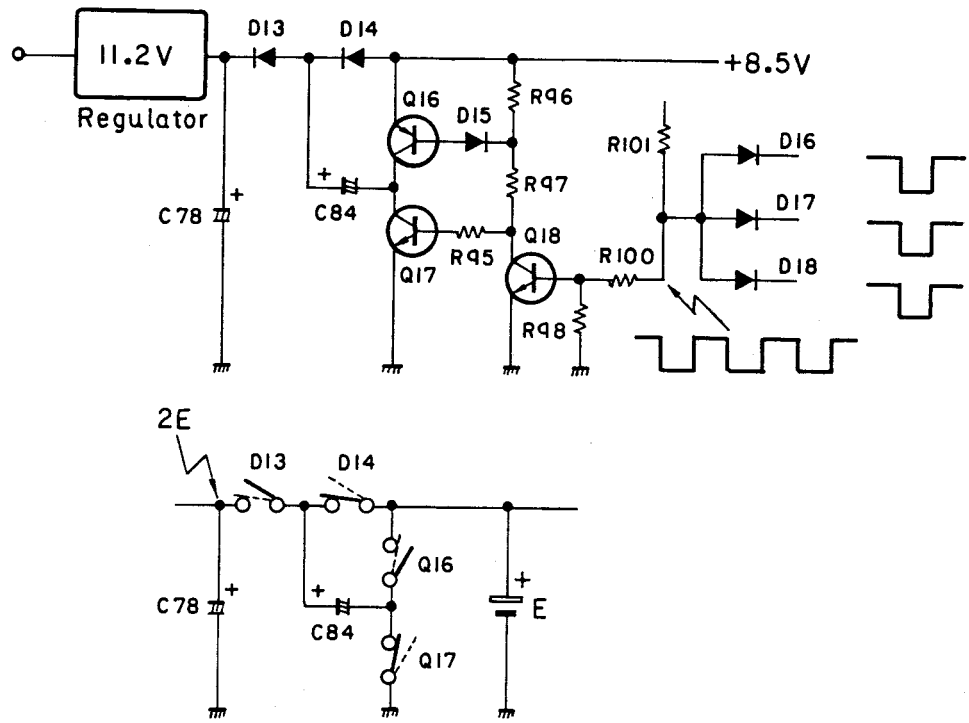


Fig. 11

3. ADJUSTMENT

3.1 CRYSTAL OSCILLATOR FREQUENCY ADJUSTMENT

• Connection Diagram

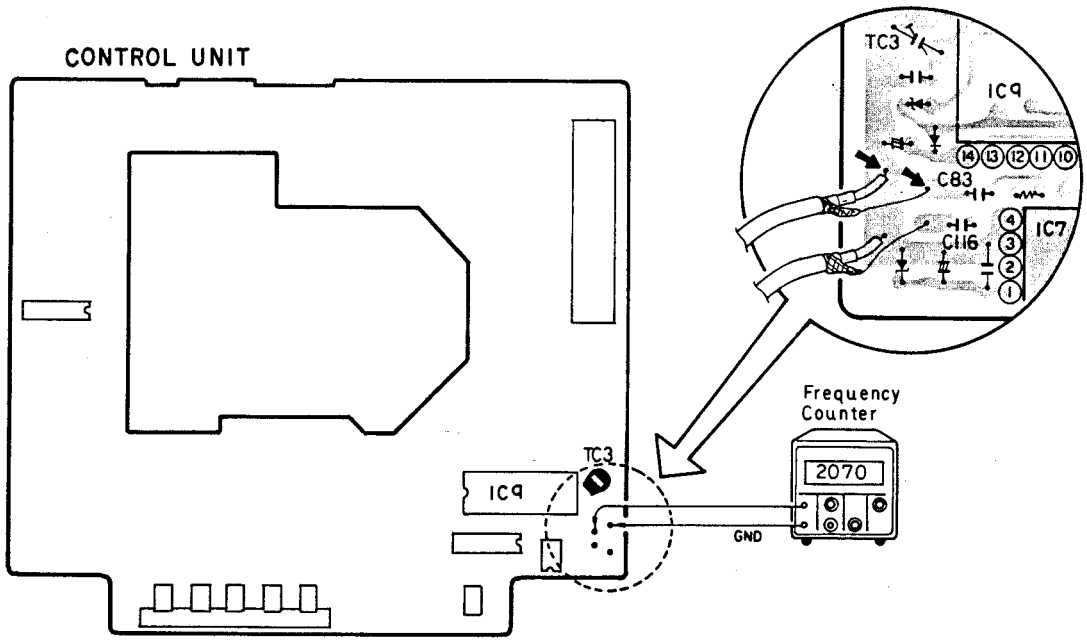


Fig. 12

• To Adjust

1. Set the band switch to AM.
2. Set the reception frequency to 1620 kHz.
3. Rotate TC3 so that the frequency counter displays 2070 kHz ±40 Hz.

3.2 FM IF ADJUSTMENT

• Connection Diagram

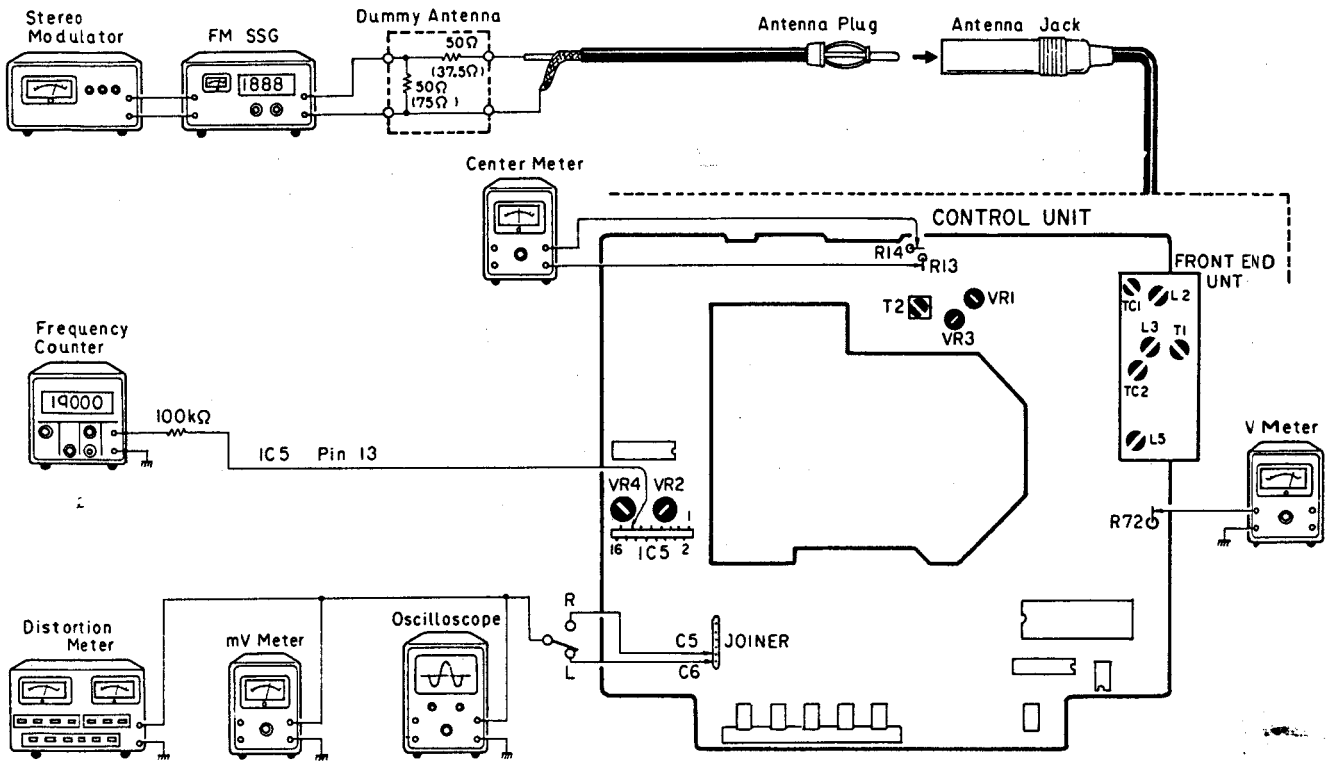


Fig. 13

• To Adjust

1. Set the band switch to FM1 (or FM2).
2. Set the FM SSG to 100% modulation at 400 Hz and supply an output signal of 98.1 MHz, 60 dB(μV).
3. Tune into a frequency of 98.1 MHz and rotate T2 to adjust the center meter pointer to 0.

3.6 FM SCAN (SEEK) SENSITIVITY ADJUSTMENT

• Connection Diagram

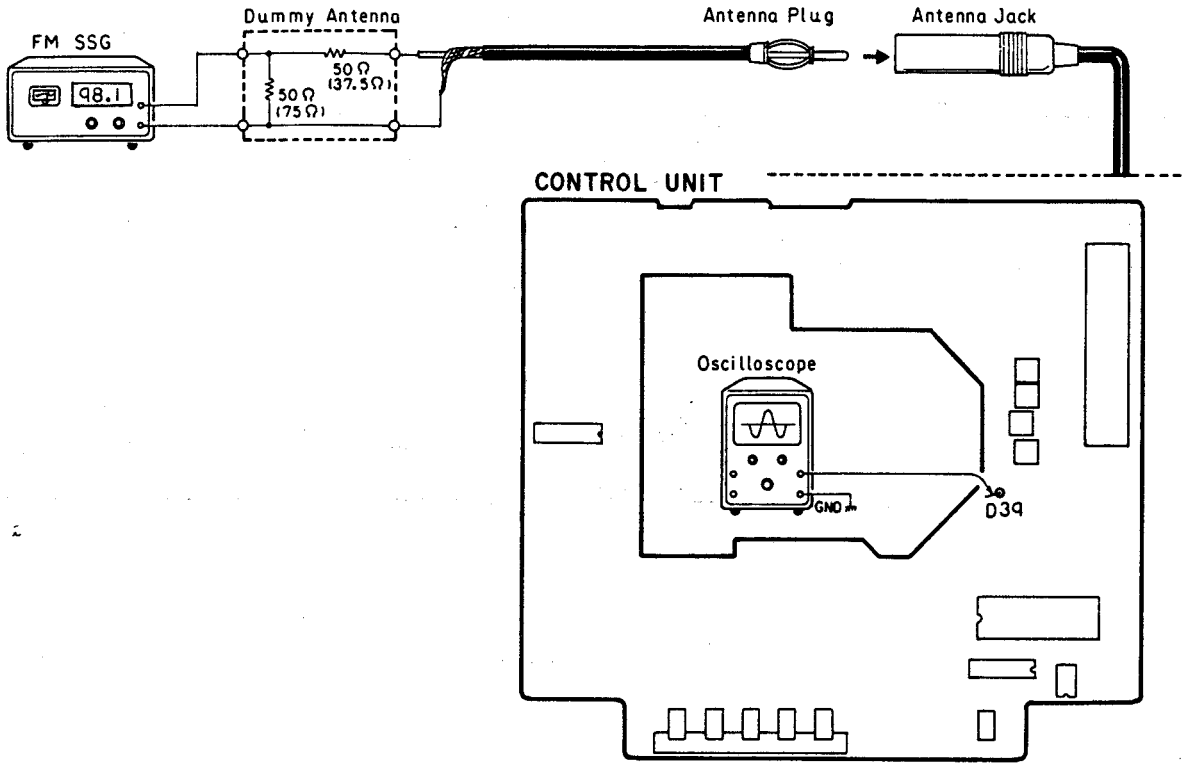


Fig. 14

• To Adjust

1. Set the mono switch to OFF (AUTO mode). Set the local switch to OFF (DISTANT mode).
2. Check that the oscilloscope waveforms are 0 V with a zero SSG output level.
3. Supply a 98.1 MHz (100% modulation) signal with an output level of 29 ±6 dB (μV) from the SSG and tune in. Check that the oscilloscope waveforms are DC 8V and that they are in the form of square waves with an average voltage of between 5 V and 8 V.
4. Set the local switch to ON (LOCAL mode) and set the SSG output level to 50 ± dB (μV).
5. Memorize the 98.1 MHz signal in one of the preset buttons, keep depressing the preset button at intervals of about 0.5 sec. and check that the oscilloscope waveforms are about 8 V.
6. The above operations may be checked with scanning or seeking.

3.3 FM TRACKING ADJUSTMENT

• Connection Diagram (shown in Fig. 13)

• To Adjust

Set the band switch to FM1 (or FM2).
Set the mono switch to ON (MONO mode).

SSG Frequency	Tuning (frequency display)	Adjustment point	V meter	mV meter
1.	107.9 MHz	L5	8.8±0.3V	
2.	87.9 MHz		2.9±0.5V check	
3. 89.9 MHz (400 Hz, 100% modulation) output level 5~10 dB (μV)	89.9 MHz	L2, L5		Maximum output
4. 106.1 MHz (400 Hz, 100% modulation) output level 5~10 dB (μV)	106.1 MHz	TC1, TC2		Maximum output
5. Repeat steps (3) and (4) alternately so that mV meter indicates the maximum output.				

3.4 FM MPX ADJUSTMENT

• Connection Diagram (shown in Fig. 13)

• To Adjust

1. Keep the mono switch at OFF (AUTO mode) and set VR1 and VR3 to the center positions.
2. Supply a non-modulated output signal of 98.1 MHz 60 dB (μV) from the SSG. Tune into a frequency of 98.1 MHz and adjust VR4 so that the frequency counter indicates 19 kHz ±30 Hz.
3. Supply a 98.1 MHz (1 kHz, 100% modulation) stereo signal with an output level of 60 dB (μV) from the SSG. Rotate VR2 and set so that the separation is brought to the maximum.

3.5 FM ARC ADJUSTMENT

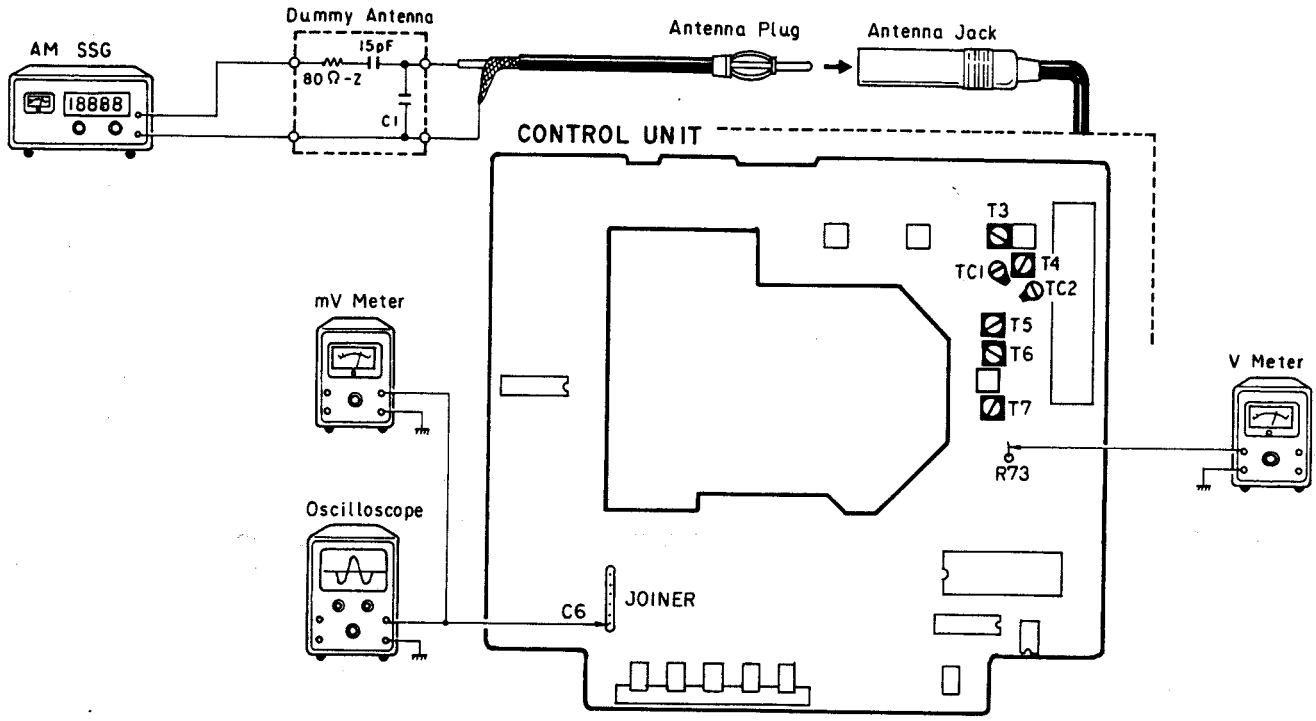
• Connection Diagram (shown in Fig. 13)

• To Adjust

1. Set the mono switch to the ON (MONO mode) position and supply a 98.1 MHz 100% modulation signal with an output level of 60 dB (μV) from the SSG. Tune into a frequency of 98.1 MHz and memorize the output.
2. Set the SSG output level to 15 dB (μV) and adjust VR1 so that a reduction of 3 dB is produced from the output level in step 1.
3. Set the mono switch to the OFF (AUTO mode) position, supply a 100% modulated stereo signal at an output level of 60 dB (μV) from the SSG, and check that the separation is at its maximum.
4. Set the SSG output level to 20 dB (μV) and rotate VR3 so that the L → R and R → L separation is set to 5 dB.
5. Set the SSG output level again to 60 dB (μV) and check that the separation is the same as that in step 3.

3.7 AM IF ADJUSTMENT

• Connection Diagram



NOTICE:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of S.S.G.

Fig. 15

• To Adjust

1. Set the band switch to AM.
2. Set the reception frequency to 1000 kHz.
3. Supply a 450 kHz signal (400 Hz, 30% modulation) from the SSG.
4. Vary the SSG output level to between 80 and 120 dB (μV) and, checking the output on the mV meter and oscilloscope, adjust T6 and T7 to bring the output to its maximum. Reduce the SSG output to the minimum level at which the waveforms can be monitored.

3.8 AM TRACKING ADJUSTMENT

• Connection Diagram (shown in Fig. 15)

• To Adjust

SSG Frequency	Tuning (frequency display)	Adjustment point	V meter	mV meter
1.	530 kHz	T5	1±0.2V	
2.	1,620 kHz		9V check	
3. 600 kHz (400 Hz, 30% modulation) output level 25 dB (μV)	600 kHz	T3, T4		Maximum output
4. 1,400 kHz (400 Hz, 30% modulation) output level 25 dB (μV)	1,400 kHz	TC1, TC2		Maximum output
5. Repeat steps (3) and (4) alternately so that mV meter indicates the maximum output.				

3.9 AM SCAN (SEEK) SENSITIVITY ADJUSTMENT

• Connection Diagram

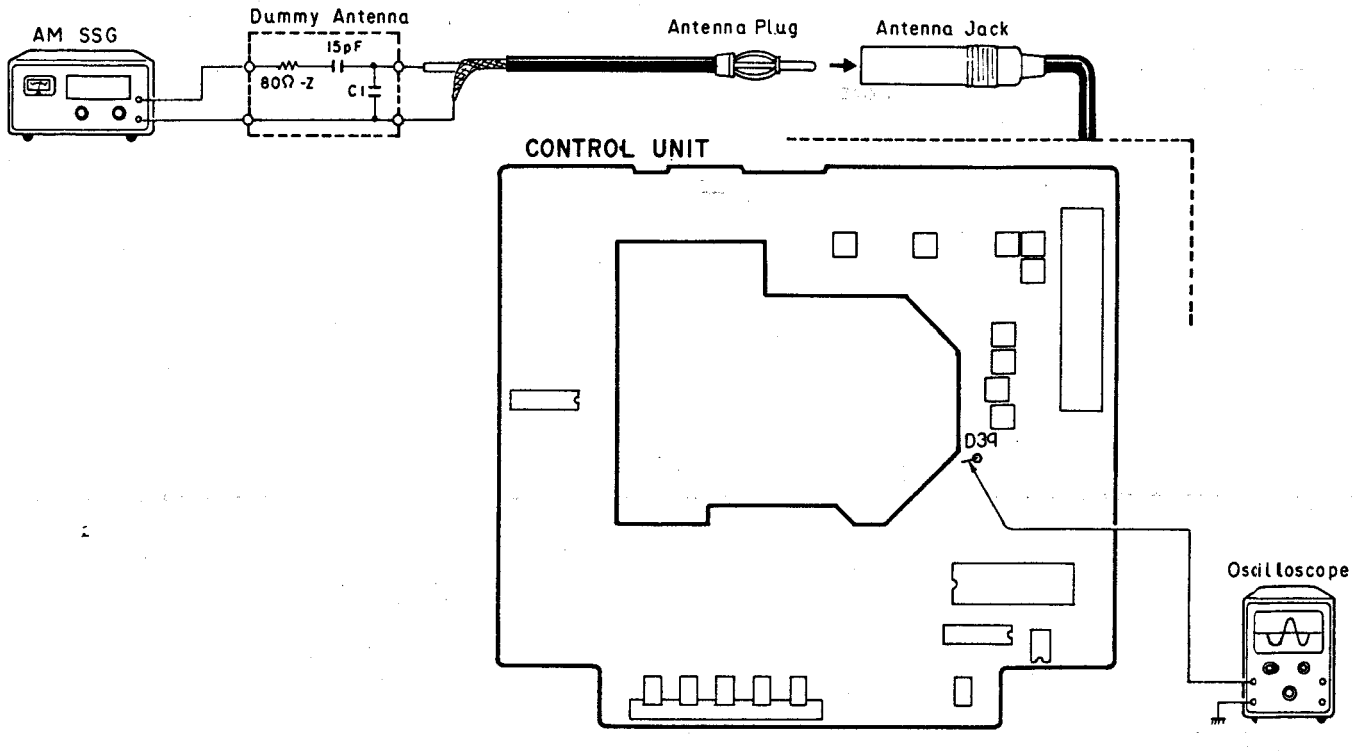


Fig. 16

NOTICE:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of S.S.G.

• To Adjust

1. Set the local switch to OFF (DISTANT mode).
2. Check that the oscilloscope waveforms are 0 V when no signal is being supplied.
3. Supply a 1,000 kHz (400 Hz, 30% modulation) signal with an output level of 26 ±10 dB (μV) from the SSG and tune the tuner to 1,000 kHz.
4. Check that the oscilloscope waveforms vary from 0 V to 8 V across a 26 ±10 dB (μV) range. (Square waves are acceptable.)
5. Set the local switch to (LOCAL mode) and memorize the 1,000 kHz frequency in one of the preset buttons.
6. Keep depressing the preset button at intervals of about 0.5 sec. and check that the oscilloscope waveforms rise from 0 V to about 8 V with an SSG output level of 46 ±10 dB (μV). (Square waves are acceptable.)

3.10 DOLBY NR ADJUSTMENT (KE-6100)

• Connection Diagram

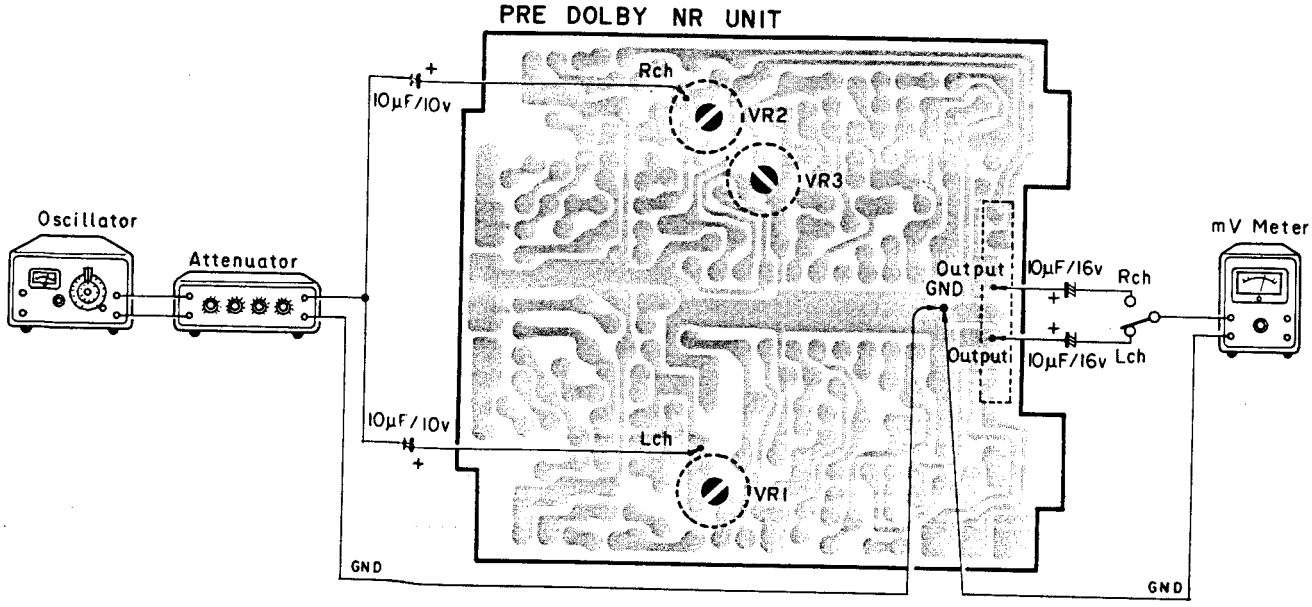


Fig. 17

• To Adjust

1. Insert a blank cassette tape, and play it.
2. Set the Dolby NR switch to OUT and apply a 5 kHz input frequency signal from the oscillator. Adjust the attenuator so that mV meter pointer deflects to 58.7 mV (−22.4 dBs).
3. Now set the Dolby NR switch to IN and adjust VR3 so that mV meter pointer deflects to 23.4 mV (−30.4 dBs).

3.11 DOLBY NR LEVEL ADJUSTMENT (KE-6100)

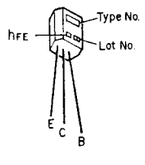
• Connection Diagram (shown in Fig. 17)

• To Adjust

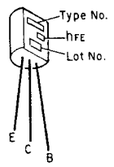
1. Disconnect oscillator and attenuator from TP1 and TP2.
2. Play back the CT-150 (400 Hz-200 nwb/m) test tape and adjust VR1 (Lch) and VR2 (Rch) so that the mV meter pointer deflects to 775 mV (0 dBs).

• IC's and Transistors

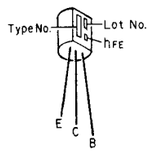
2SA1048
2SC2458
2SC2458L



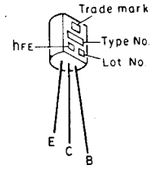
2SA872A
2SB562
2SD655



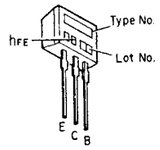
2SC1674
2SC1675
2SC1815



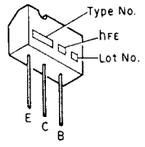
2SA720
2SC1318



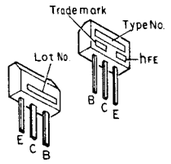
2SC2786
2SC2787



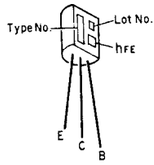
2SA790
2SC1545



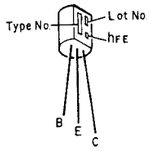
2SA673A
2SC1213A



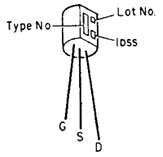
2SA1016



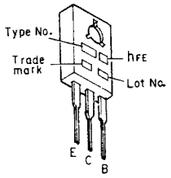
2SC2570



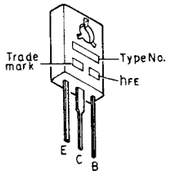
2SK49



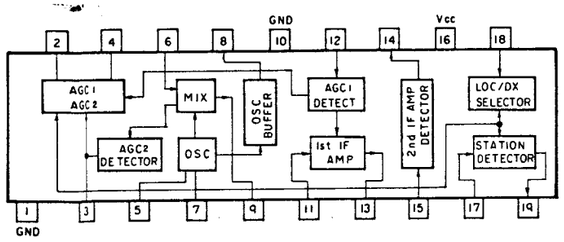
2SD882



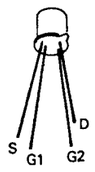
2SA715WT



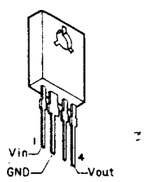
μPC1215V



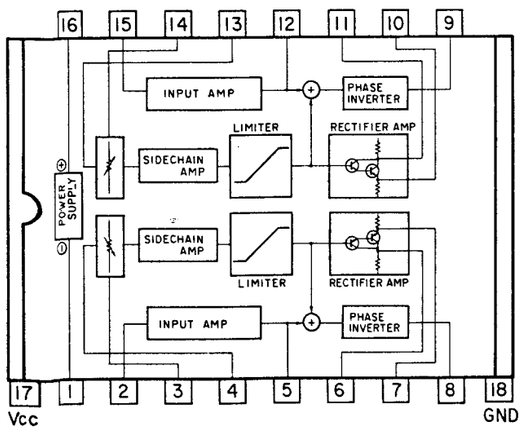
P001



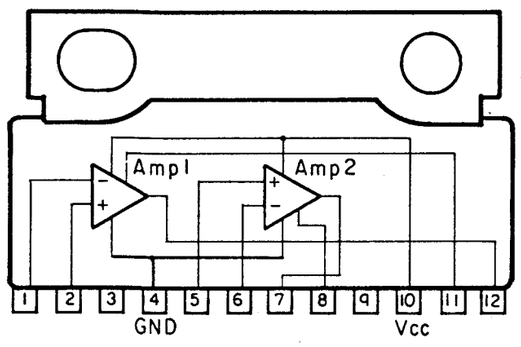
LVC509



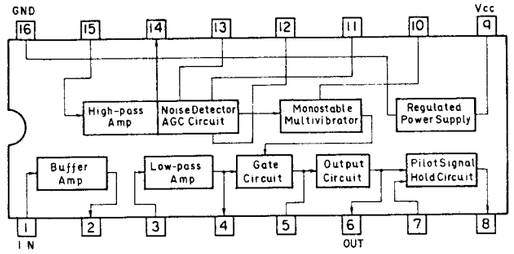
HA11226



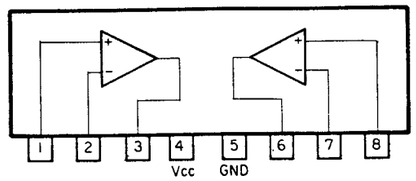
HA1398



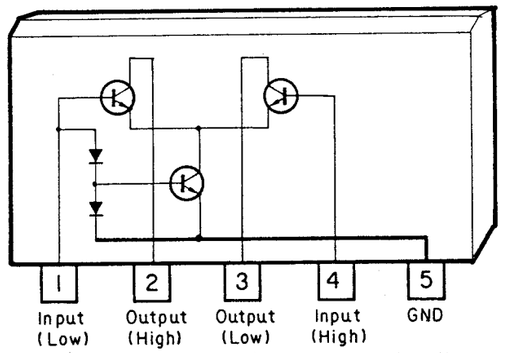
LA2101



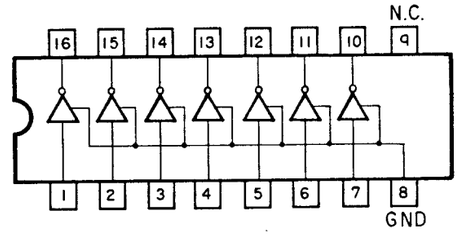
MB3106M



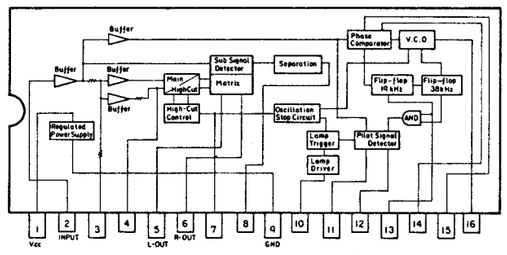
M5215L



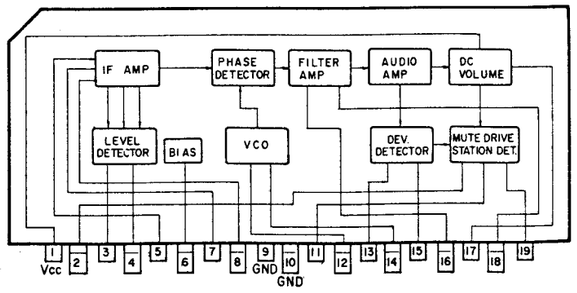
IR2403



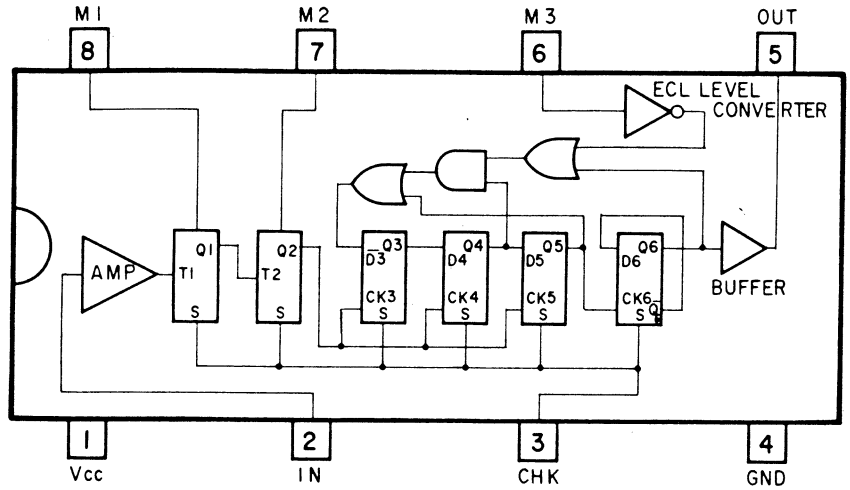
LA3370P



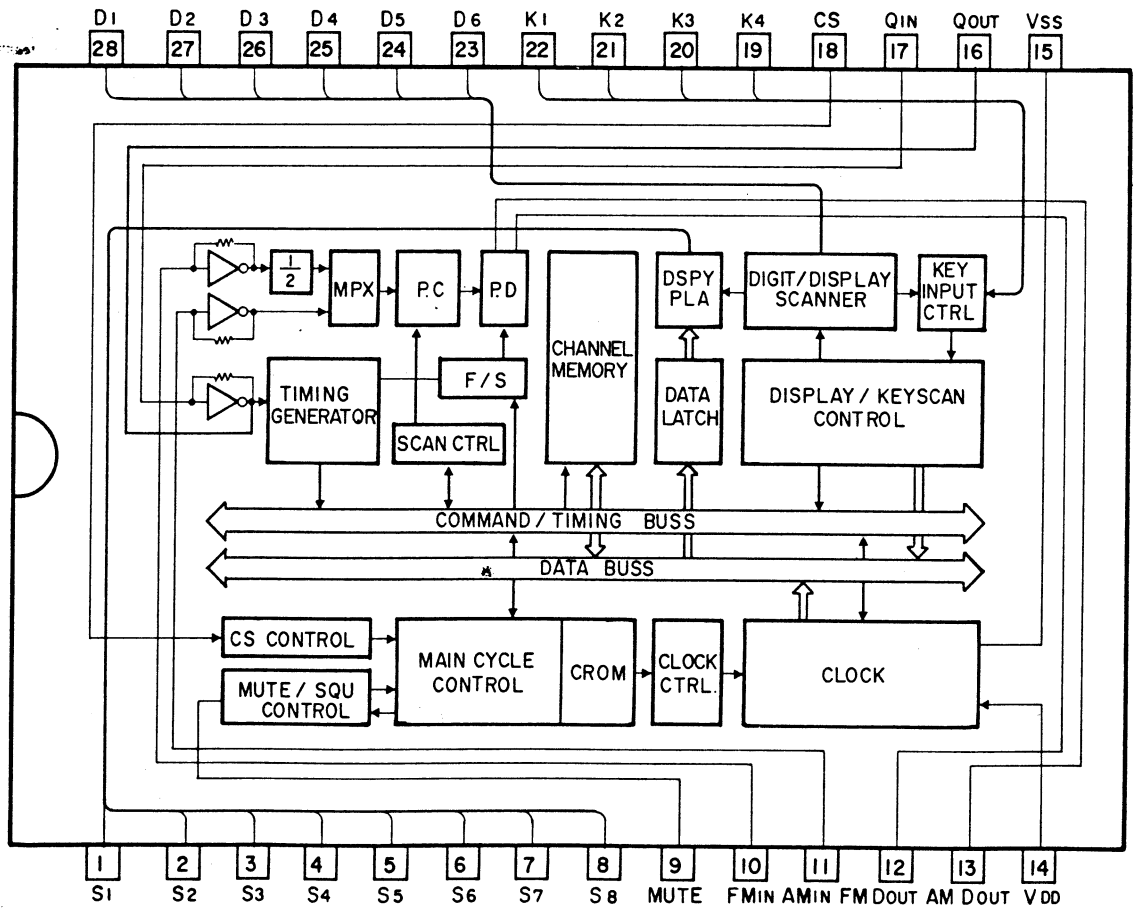
PA4007



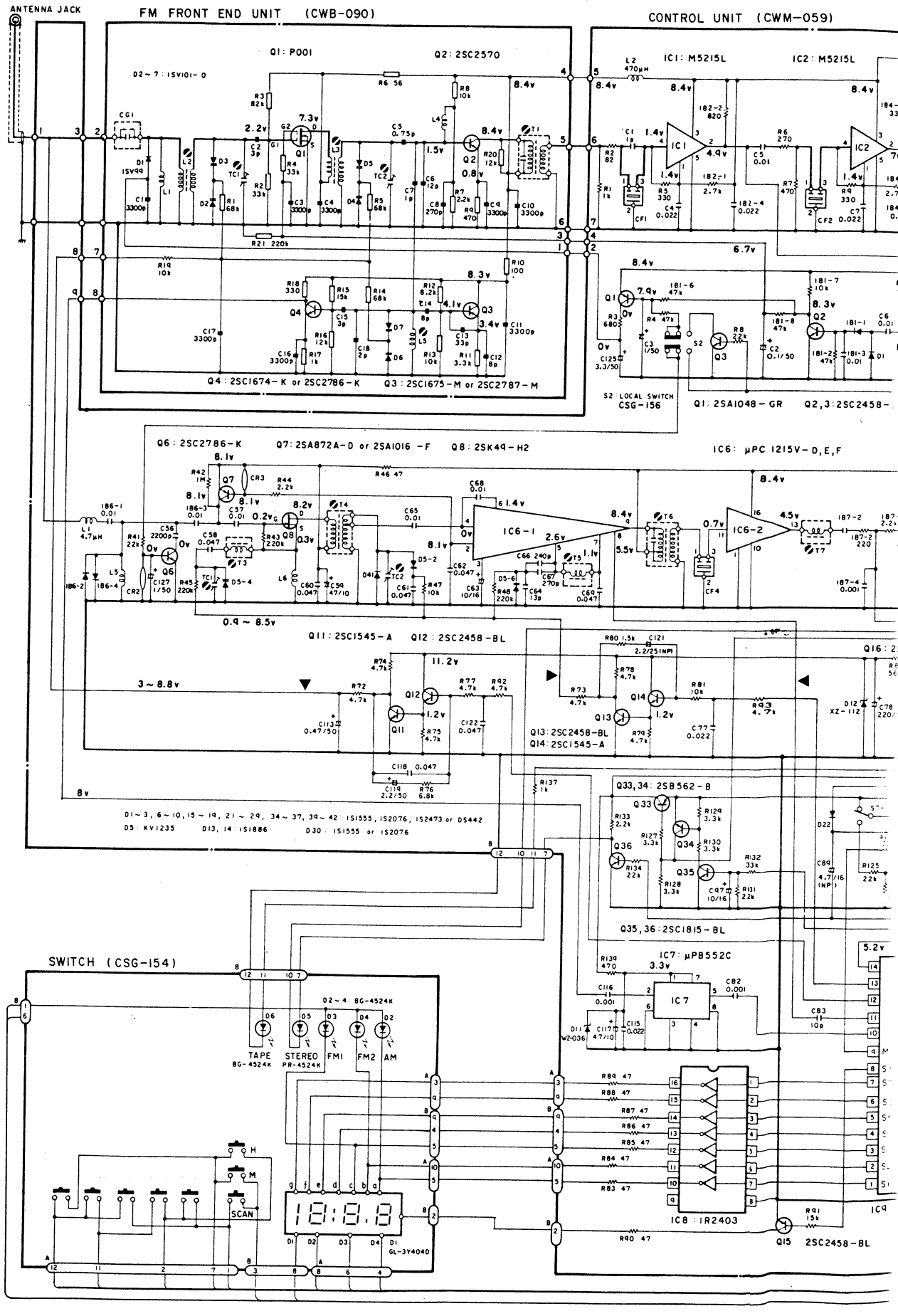
μPB552C

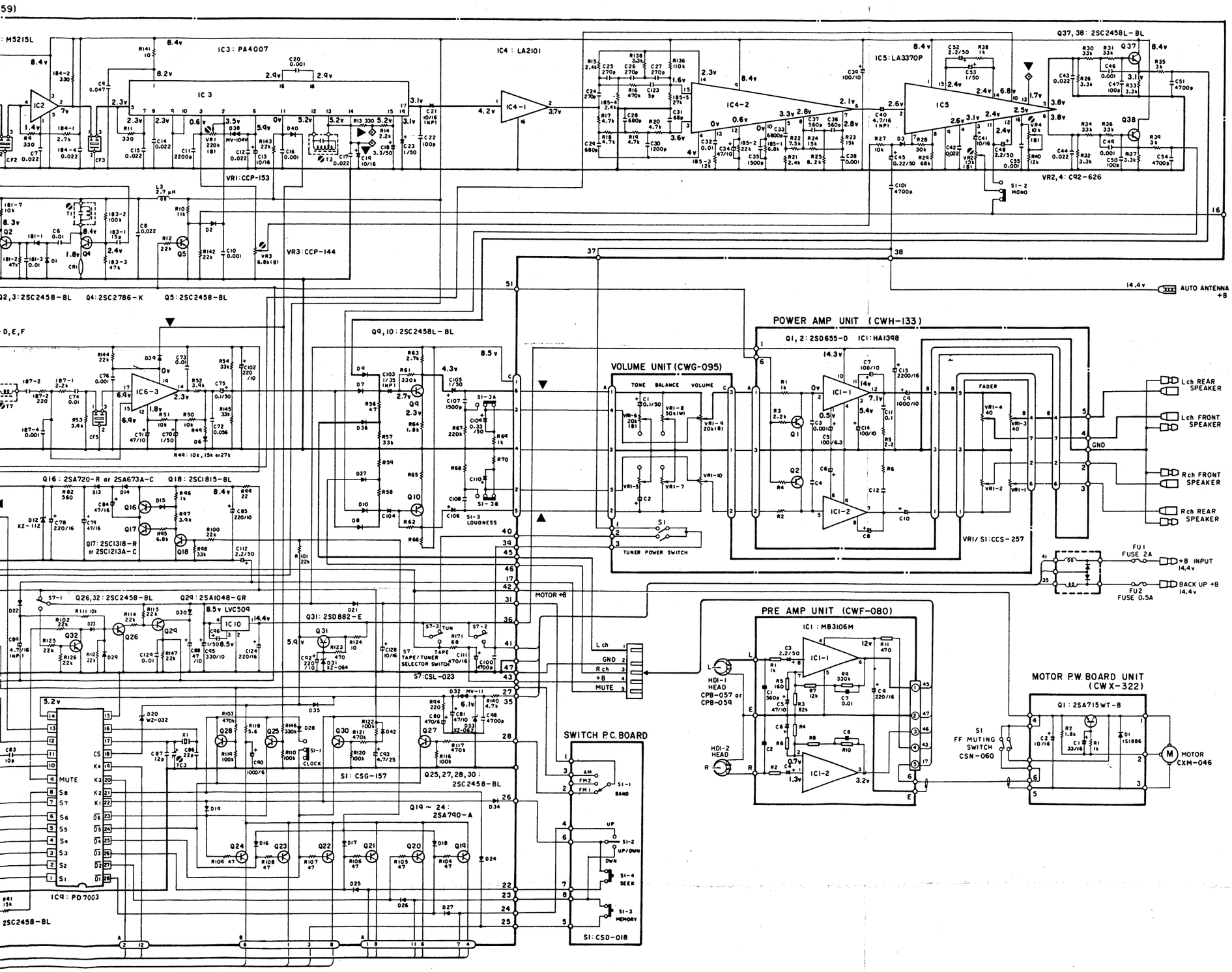


PD7003



4. SCHEMATIC CIRCUIT DIAGRAM (KE-5100)





SWITCHES:

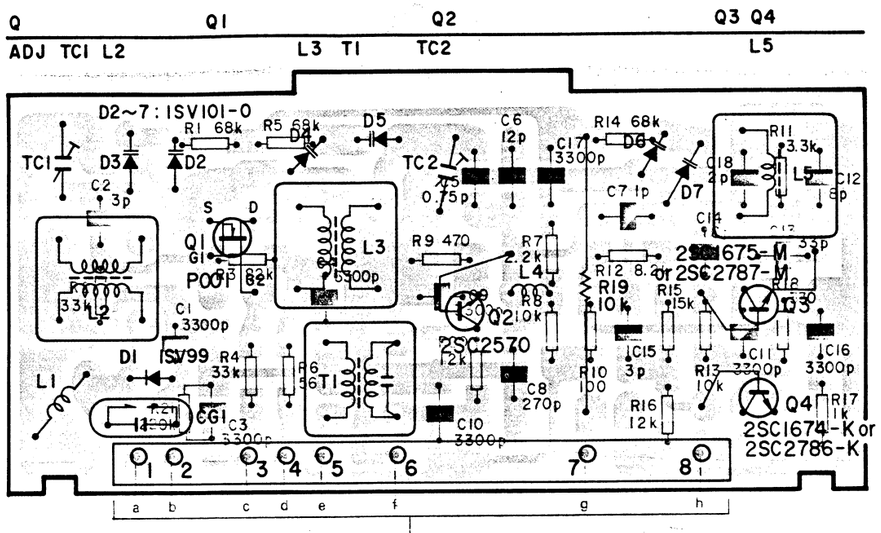
- CONTROL UNIT
  - S1: CLOCK — ON—OFF
  - MONO — ON—OFF
  - LOUDNESS — ON—OFF
  - S2: LOCAL — ON—OFF
  - S7: TAPE/TUNER — TAPE—TUNER
- VOLUME UNIT
  - S1: TUNER POWER — ON—OFF
- SWITCH P.C.BOARD
  - S1: BAND — FM1—FM2—AM
  - UP/DOWN — UP—OFF—DOWN
  - SEEK — ON—OFF
  - MEMORY — ON—OFF
- MISCELLANEOUS
  - S1: FF/REW MUTING — ON—OFF

The underlined indicates the switch position.

Note:
The FM front end unit and the Pre Amp unit employ chip resistors indicated by "—□—" and chip capacitors indicated by "—■—."

Fig. 18

5. CONNECTION DIAGRAM (KE-5100)

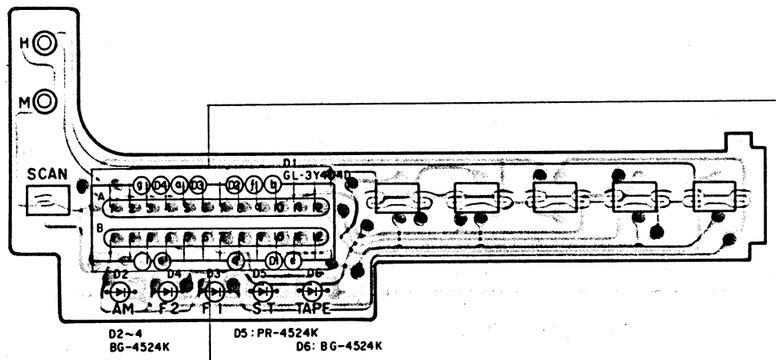


FM FRONT END UNIT (CWB—090)

Q1	
G1	2.2V
G2	8.5V
D	7.3V
S	0V

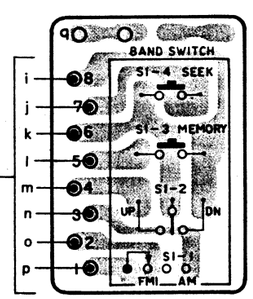
G2	
E	0.8V
C	8.4V
B	1.5V

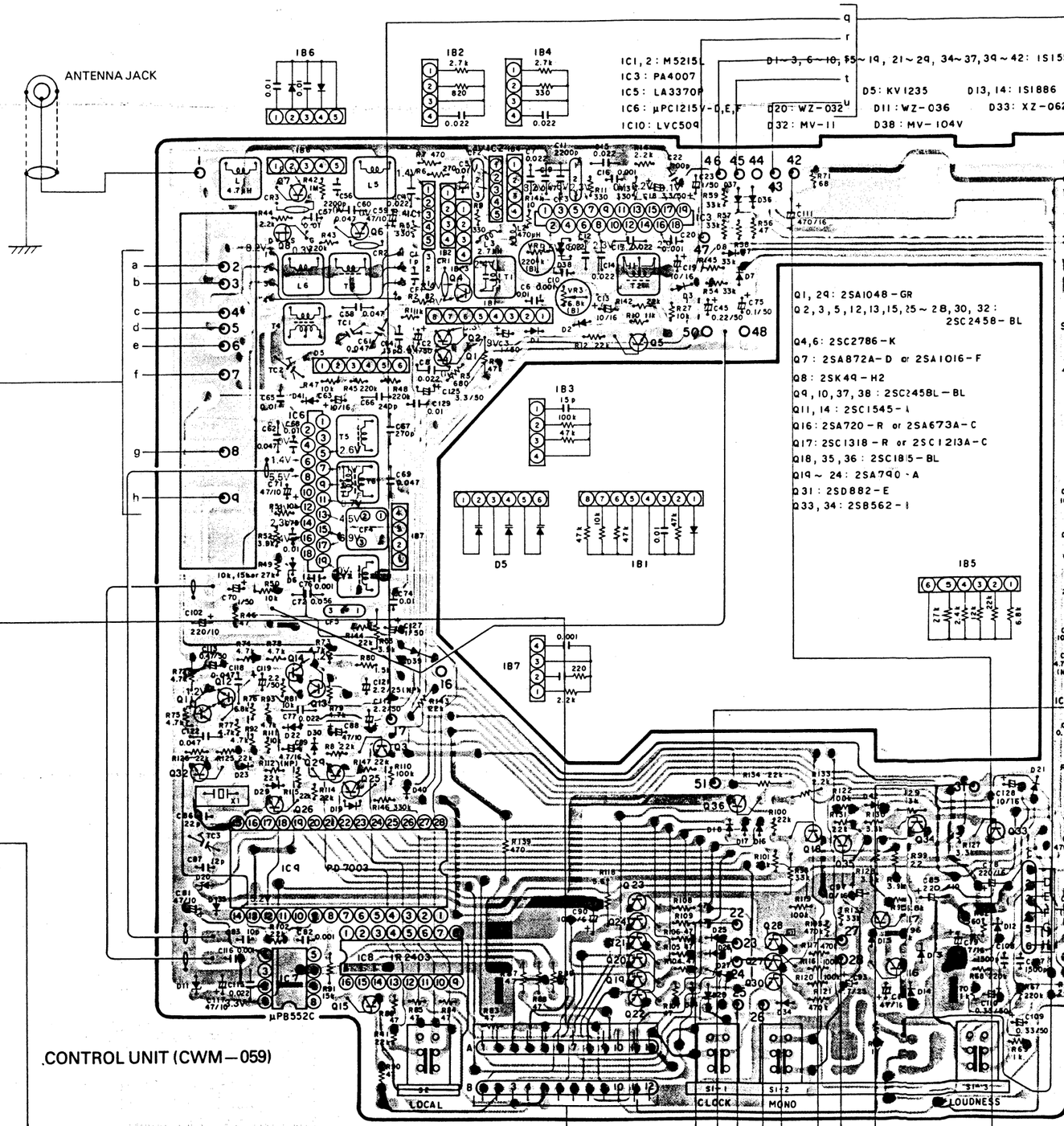
Q3	
E	3.4V
C	8.3V
B	4.1V



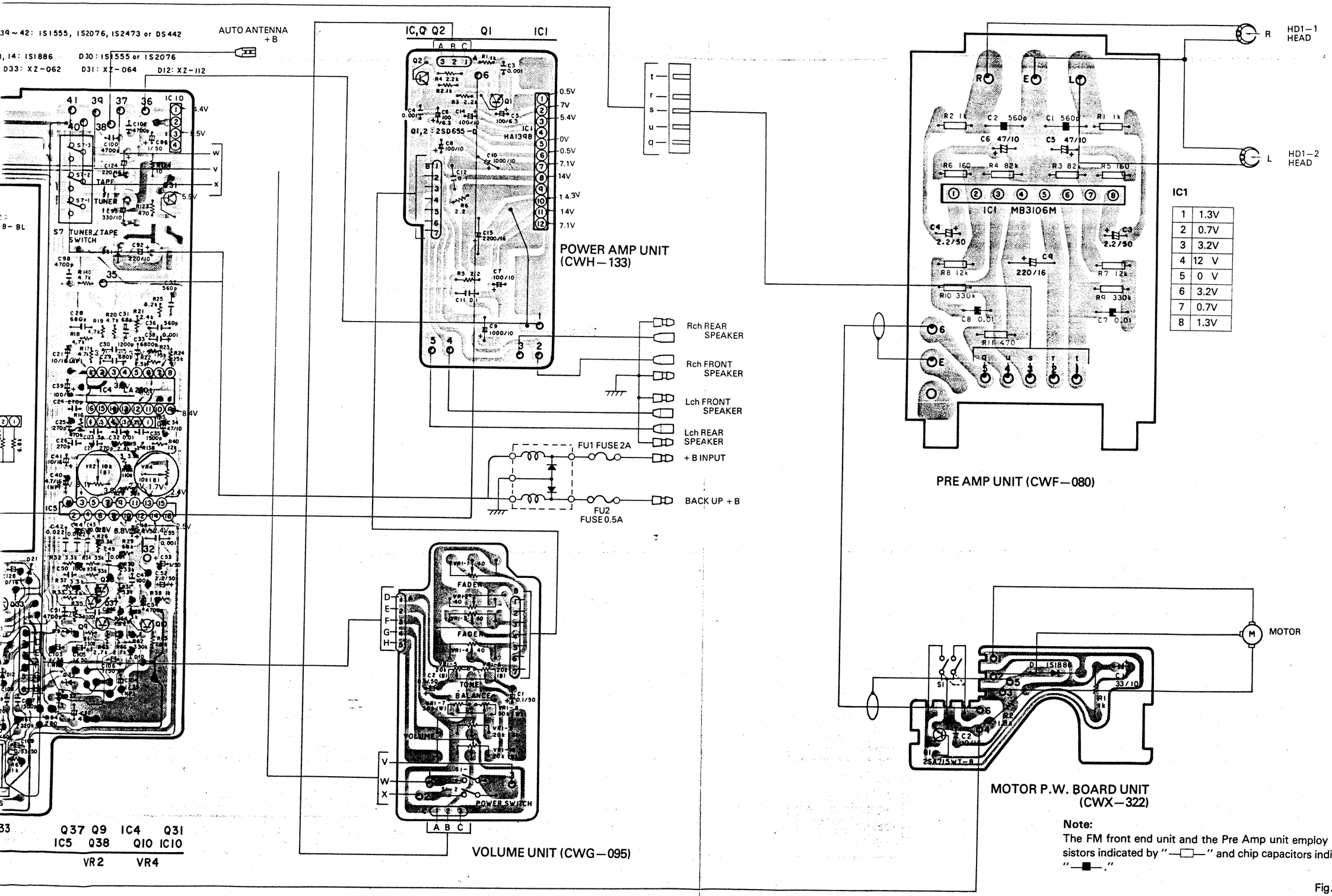
SWITCH (CSG—154)

SWITCH P.C. BOARD





CONTROL UNIT (CWM—059)



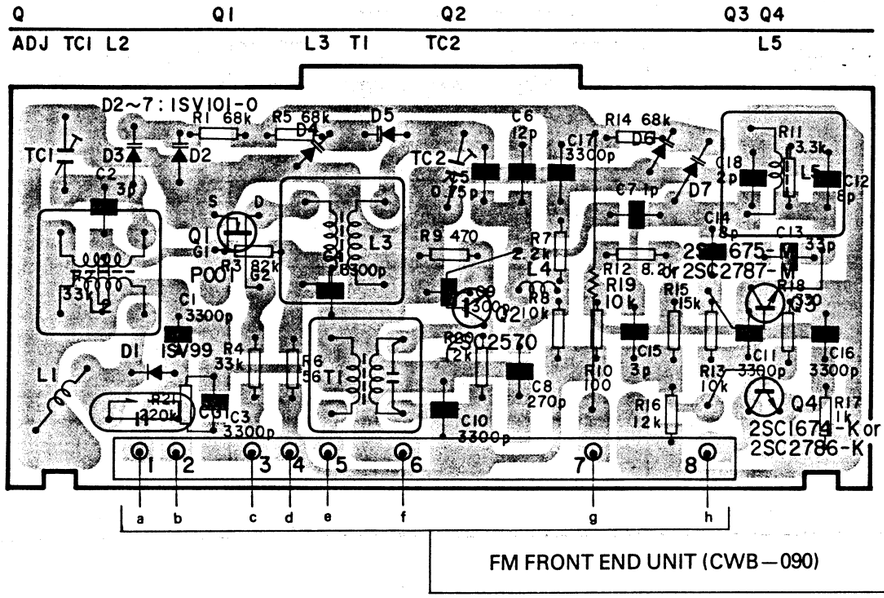
IC1

1	1.3V
2	0.7V
3	3.2V
4	12 V
5	0 V
6	3.2V
7	0.7V
8	1.3V

Note:
The FM front end unit and the Pre Amp unit employ chip resistors indicated by "—□—" and chip capacitors indicated by "—■—."

Fig. 19

6. CONNECTION DIAGRAM (KE-6100)



Q1

G1	2.2V
G2	8.5V
D	7.3V
S	0V

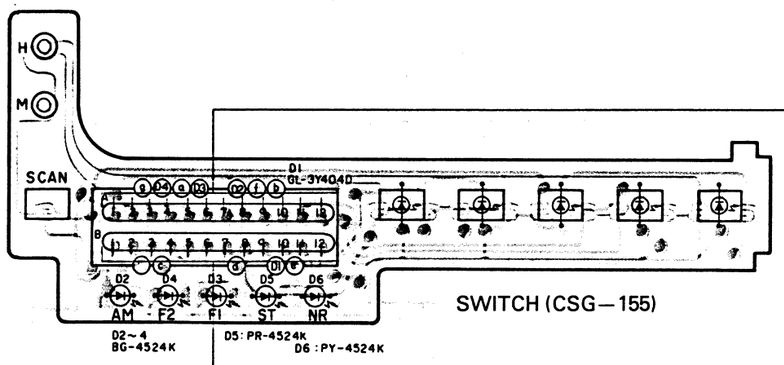
Q3

E	3.4V
C	8.3V
B	4.1V

G2

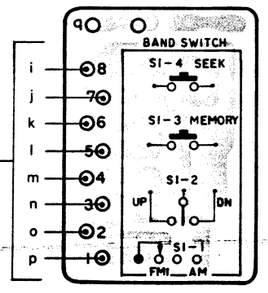
E	0.8V
C	8.4V
B	1.5V

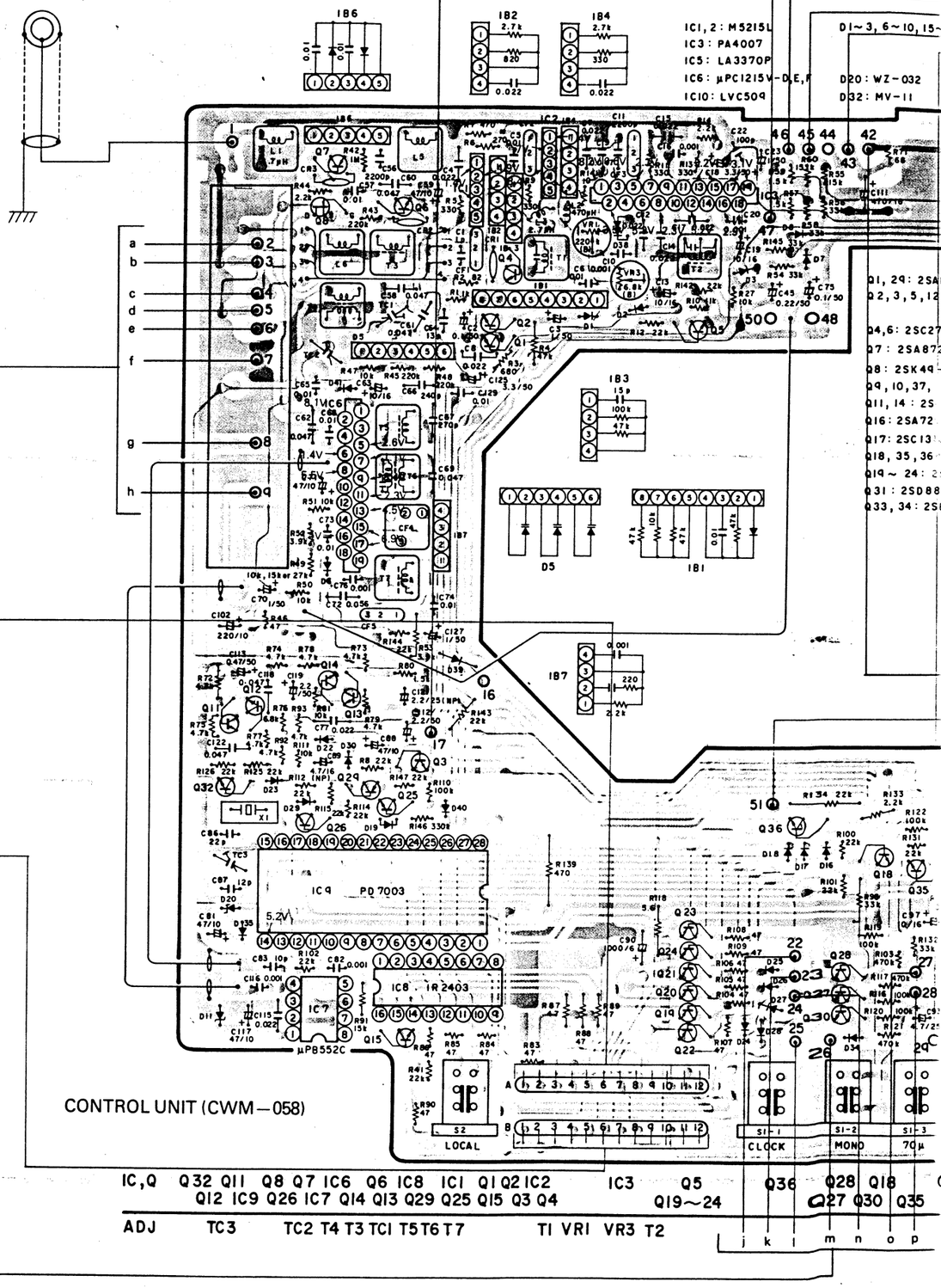
FM FRONT END UNIT (CWB—090)



SWITCH (CSG—155)

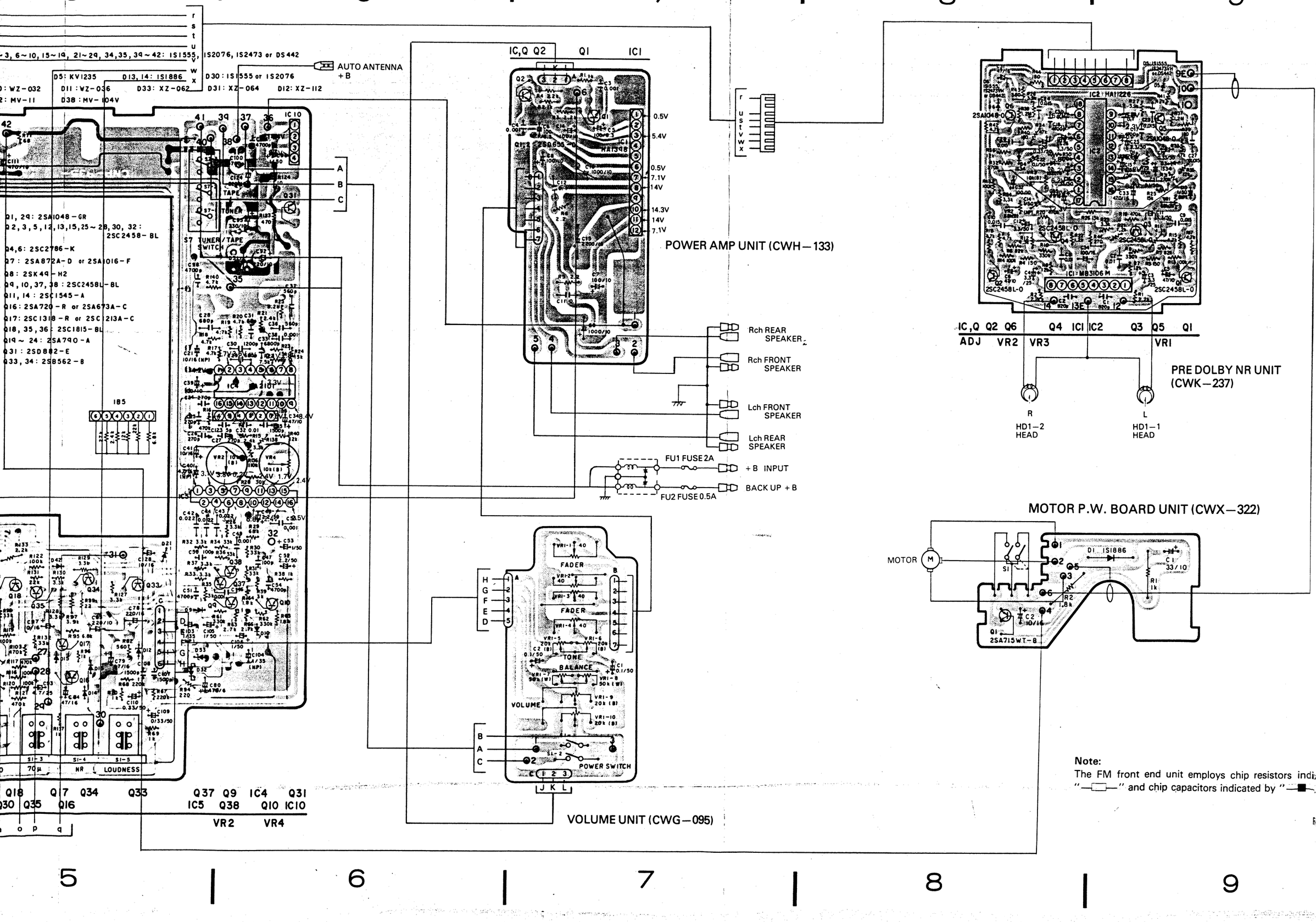
SWITCH P.C. BOARD





CONTROL UNIT (CWM—058)

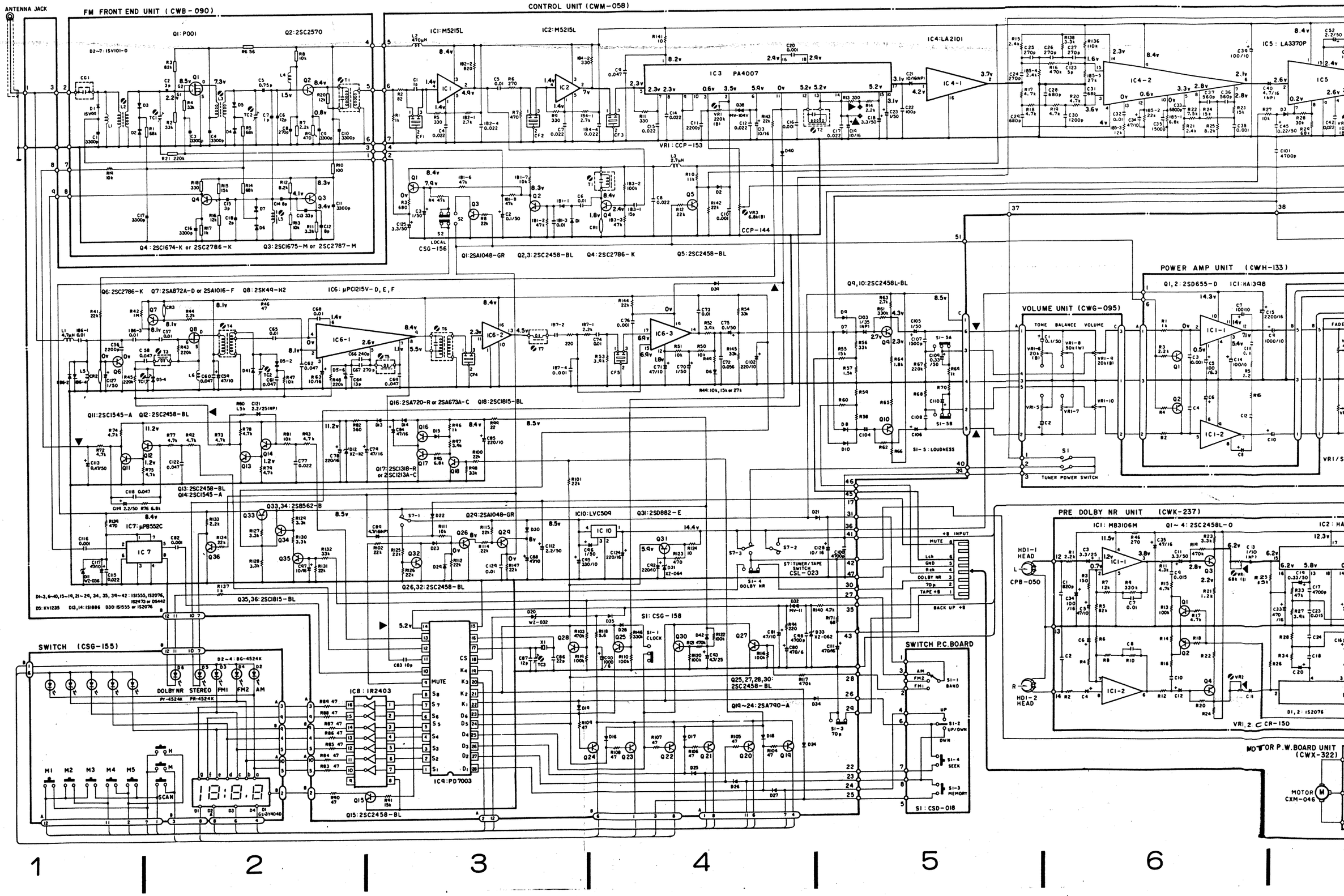
| IC,Q | | |

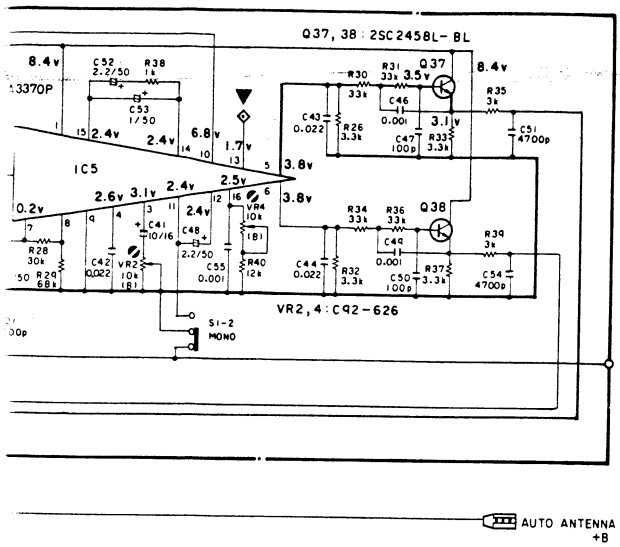


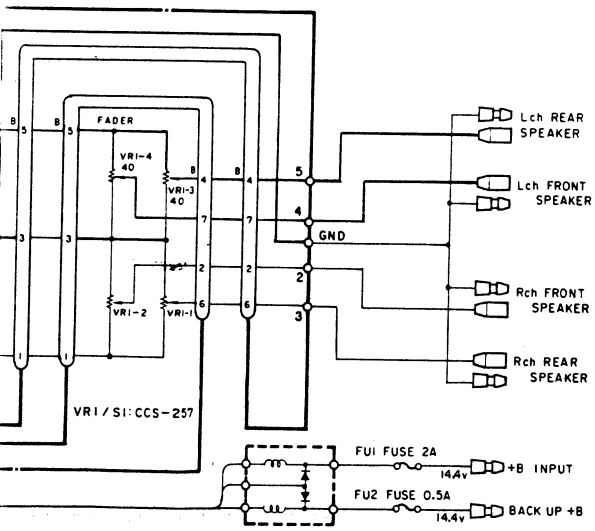
Note:
The FM front end unit employs chip resistors indiated by "—□—" and chip capacitors indicated by "—■—."

Fig. 20

7. SCHEMATIC CIRCUIT DIAGRAM (KE-6100)







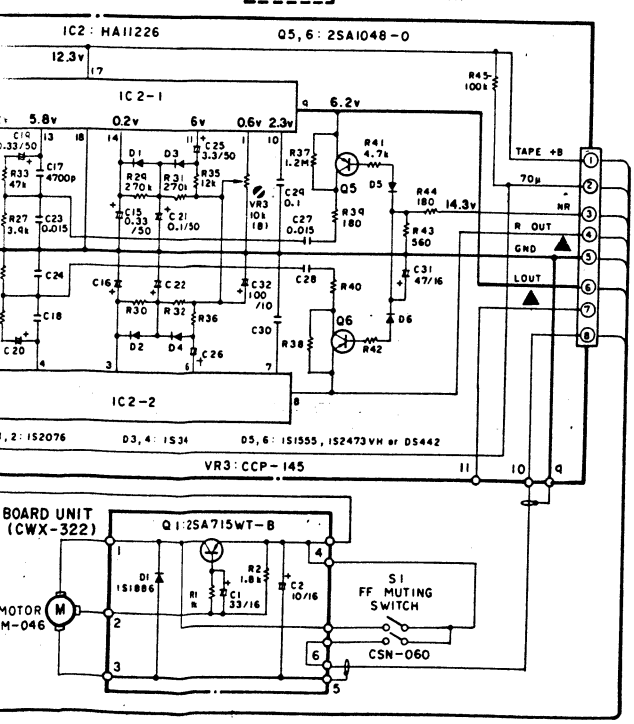


Fig. 21

SWITCHES:

- CONTROL UNIT
  - S1: CLOCK — ON—OFF
  - MONO — ON—OFF
  - 70μs — ON—OFF
  - DOLBY NR — ON—OFF
  - LOUDNESS — ON—OFF
  - S2: LOCAL — ON—OFF
  - S7: TAPE/TUNER — TAPE—TUNER
- VOLUME UNIT
  - S1: TUNER POWER — ON—OFF
- SWITCH P.C.BOARD
  - S1: BAND — FM1—FM2—AM
  - UP/DOWN — UP—OFF—DOWN
  - SEEK — ON—OFF
  - MEMORY — ON—OFF
- MISCELLANEOUS
  - S1: FF/REW MUTING — ON—OFF

The underlined indicates the switch position.

Note:
The FM front end unit employs chip resistors indicated by "—□—" and chip capacitors indicated by "—■—."

8. CABINET EXPLODED VIEW

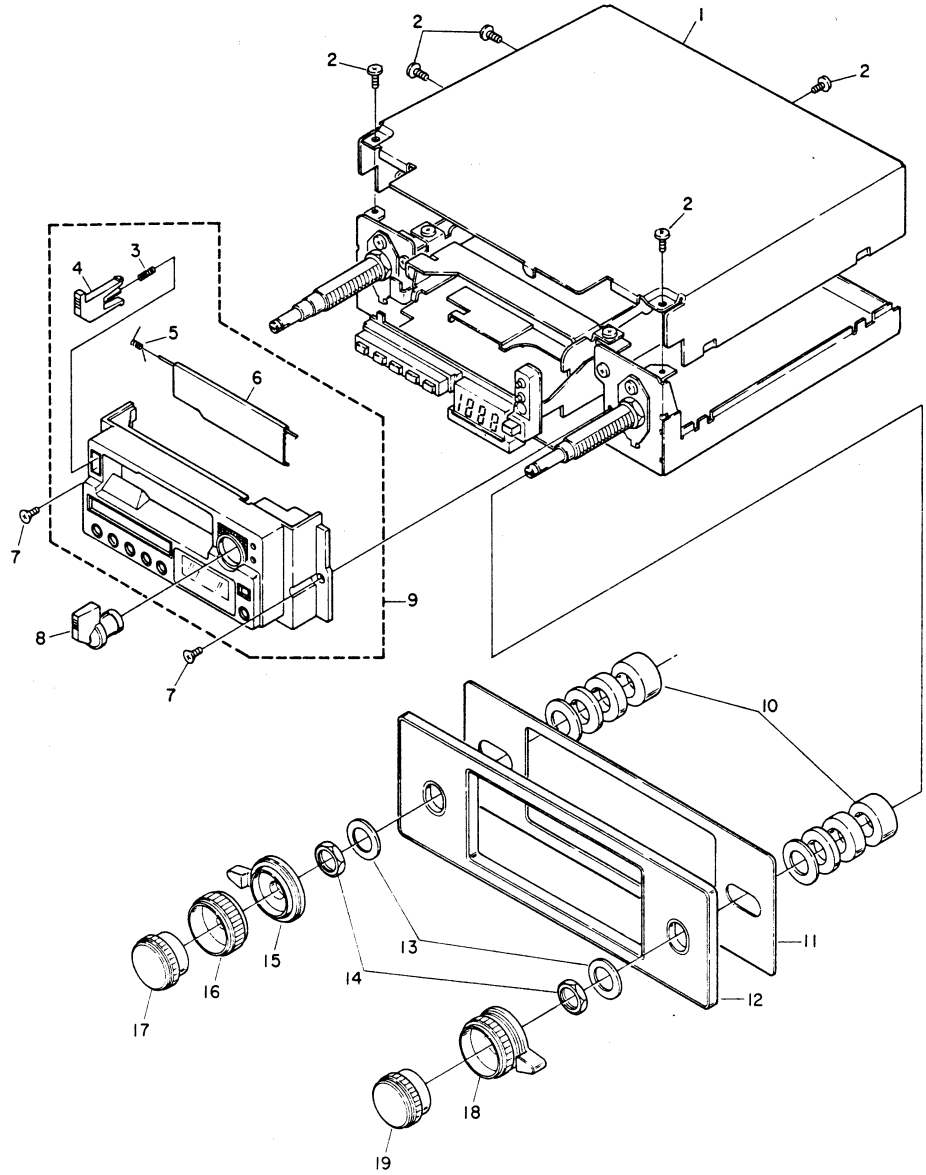


Fig. 22

Mark	No.	Part No.	Description
	1.	CNB-612	Case
	2.	BMZ30P040FMC	Screw
	3.	CBH-399	Spring
★	4.	CAC-235	Button (Eject)
	5.	CBH-587	Spring
	6.	CAT-103	Door
	7.	CMZ26P080FMC	Screw
★	8.	CAA-239	Knob (FF/REW)
	9.	CXC-282	Grille Assy (KE-5100)
		CXC-281	Grille Assy (KE-6100)
	10.	CNV-769	Washer

Mark	No.	Part No.	Description
	11.	CNC-326	Panel Sheet
	12.	CXC-352	Panel Unit (KE-6100/US)
		CXC-284	Panel Unit (KE-6100/CA, KE-5100/US, CA)
	13.	CBE-084	Spacer, 10ϕ × 1t
	14.	CBA-023	Nut, 9.4ϕ × 2.4t
★	15.	CAA-280	Knob (Fader)
★	16.	CAA-279	Knob (Tone)
★	17.	CAA-278	Knob (Volume, Balance, Tuner Power)
★	18.	CAA-277	Knob (Band)
★	19.	CAA-343	Knob (Up/Down, Seek, Memory)

9. CHASSIS EXPLODED VIEW

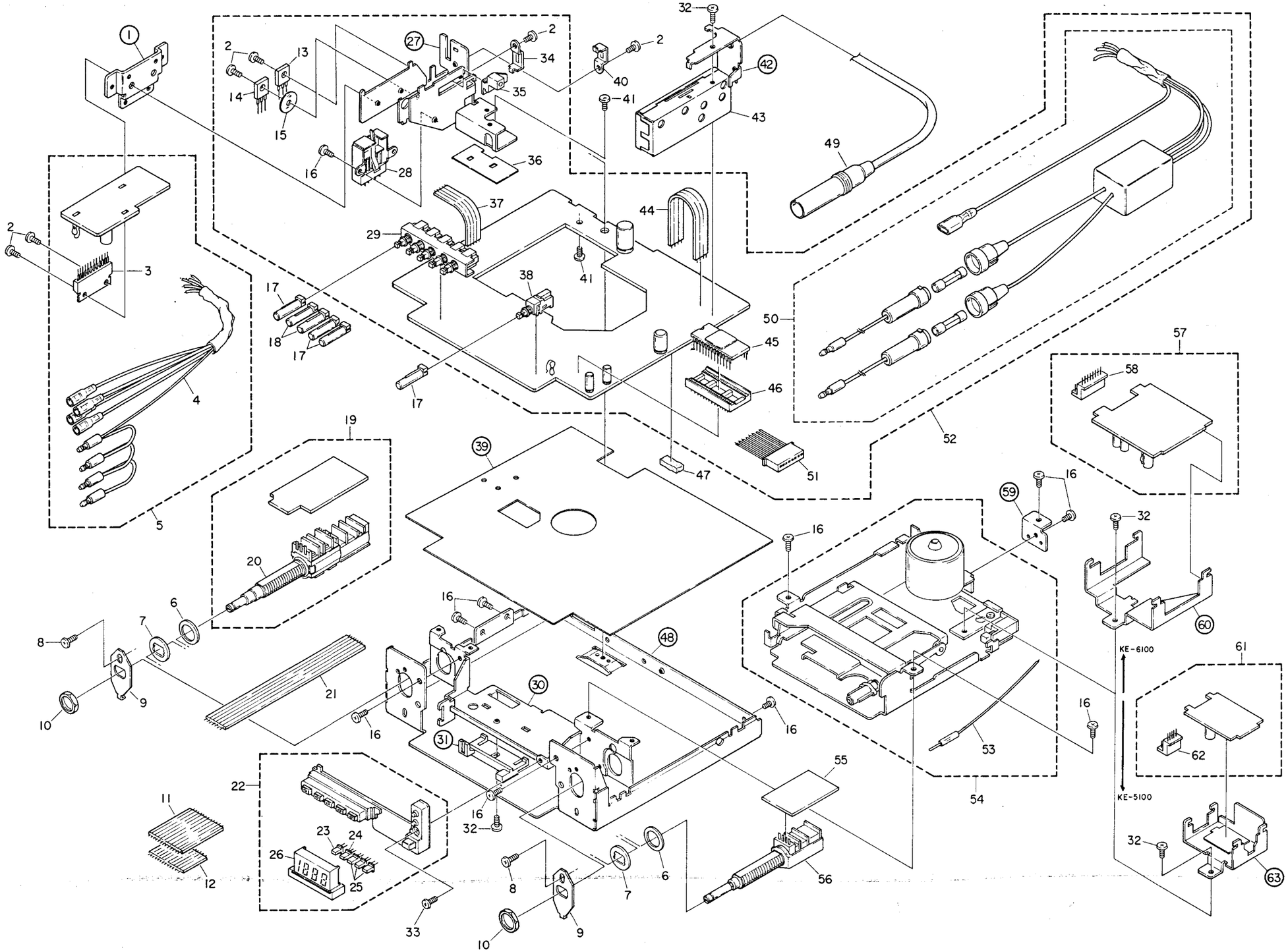


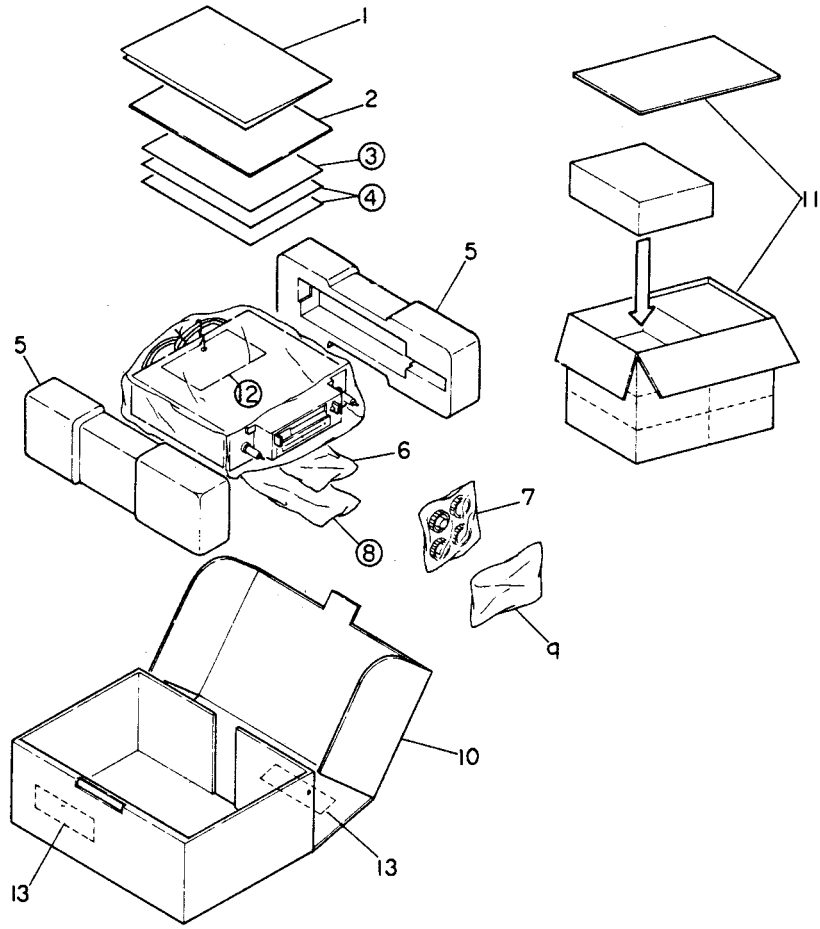
Fig. 23

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

CHASSIS

Mark	No.	Part No.	Description
	1.		Heat Sink
	2.	BMZ30P050FMC	Screw
★★	3.	HA1398	IC
	4.	CDE-815	Cord
	5.	CWH-133	Power Amp Unit
	6.	CBE-084	Spacer, 10ϕ × 1t
	7.	CNW-235	Spacer
	8.	BMZ30P030FMC	Screw
	9.	CNE-706	Holder
	10.	CBA-023	Nut, 9.4ϕ × 2.4t
	11.	CDE-811	Connector
	12.	CDE-810	Connector
★★	13.	LVC509	IC
★★	14.	2SD882	Transistor
	15.	CNM-558	Insulator
	16.	BMZ30P040FMC	Screw
★	17.	CAC-340	Button (Loud, Mono, Clock, Local)
★	18.	CAC-340	Button (KE-6100) (Dolby NR, 70 μ)
	19.	CWG-095	Volume Unit
★★	20.	CCS-257	Volume/Switch (Tuner Power) Volume, 20 kΩ (B) × 2, 50 kΩ (W), 40 Ω × 2 (Tone, Balance, Volume, Fader)
	21.	CDE-808	Connector
★★	22.	CSG-154	Switch (KE-5100)
★★		CSG-155	Switch (KE-6100)
★	23.	BG-4524K	LED (Green) (KE-5100)
★		PY-4524K	LED (Yellow) (KE-6100)
★	24.	PR-4524K	LED (Red)
★	25.	BG-4524K	LED (Green)
★	26.	GL-3Y404D	LED Display
	27.		Holder
★★	28.	CSL-023	Switch (Tape/Tuner)
★★	29.	CSG-157	Switch (KE-5100) (Loud, Mono, Clock)
★★		CSG-158	Switch (KE-6100) (Loud, Dolby NR, 70 μs, Mono Clock)
	30.		Frame
	31.		Guide
	32.	BMZ26P040FMC	Screw
	33.	BMZ26P060FMC	Screw
	34.	CNF-017	Clamper
	35.	CNW-119	Lever
	36.	CNM-626	Insulator
	37.	CDE-814	Connector
★★	38.	CSG-156	Switch (Local)
	39.		Insulator
	40.	CNF-029	Clamper
	41.	BMZ30P060FMC	Screw
	42.		Holder
	43.	CWB-090	FM Front End Unit
	44.	CDE-812	Connector
★★	45.	PD7003	IC
	46.	CKH-001	Socket
	47.	CNM-572	Spacer
	48.		Chassis
	49.	CDH-054	Antenna Cable
★	50.	CDE-862	Cord
	51.	CDE-864	Connector (5P) (KE-5100)
		CDE-860	Connector (7P) (KE-6100)
	52.	CWM-059	Control Unit (KE-5100)
		CWM-058	Control Unit (KE-6100)
	53.	CDE-299	Connector
	54.	CXC-115	Cassette Mechanism Assy (KE-5100)
		CXC-145	Cassette Mechanism Assy (KE-6100)
	55.	CNP-957	P.C. Board
★★	56.	CSD-018	Switch (Band, Up/Down, Seek, Memory)
	57.	CWK-237	Pre Dolby NR Unit (KE-6100)
	58.	CKS-090	Plug (KE-6100)
	59.		Holder
	60.		Holder (KE-6100)
	61.	CWF-080	Pre Amp Unit (KE-5100)
	62.	CKS-117	Connector (KE-5100)
	63.		Holder (KE-5100)

10. PACKING METHOD



PACKING METHOD

Fig. 24

Mark	No.	Part No.	Description
	1.	CRB-407	Owner's Manual (KE-5100/US)
		CRD-164	Owner's Manual (KE-5100/CA)
		CRB-406	Owner's Manual (KE-6100/US)
		CRD-163	Owner's Manual (KE-6100/CA)
	2.	CRG-011	FM Guide (KE-5100/US, KE-6100/US)
	3.		Card
	4.		Card (KE-5100/US, KE-6100/US)
	5.	CHB-930	Styrofoam (1 set pair)
	6.	CEA-400	Accessory Kit
	6-1.	CNC-975	Strap
	6-2.	CDE-437	Cord
	6-3.	CNV-769	Washer
	6-4.	CEA-216	Screw Kit
	6-4-1.	CBA-028	Screw for Strap
	6-4-2.	B70-055-A	Nut, 4ϕ × 4.5t
	6-4-3.	WS40FMC	Washer
	6-4-4.	PMB50P200	Screw
	6-4-5.	B70-056-A	Nut, 5ϕ × 5.3t
	6-4-6.	CBE-084	Spacer, 10ϕ × 1t
	6-4-7.	CBA-023	Nut, 9.4ϕ × 2.4t
	7.	CEA-473	Knob Kit
★	7-1.	CAA-280	Knob (Fader)
★	7-2.	CAA-279	Knob (Tone)
★	7-3	CAA-278	Knob (Volume, Balance, Tuner Power)
★	7-4.	CAA-277	Knob (Band)
★	7-5.	CAA-343	Knob (Up/Down, Seek, Memory)
	8.		Panel Assy
	8-1.	CXC-284	Panel Unit (KE-6100/CA, KE-5100/US, CA)
		CXC-352	Panel Unit (KE-6100/US)
	8-2.	CNC-326	Panel Sheet
	8-3.	CEG-158	Polyethylene Bag
	9.	CNS-416	Cover
	10.	CHC-066	Carton (KE-5100/US, CA)
		CHC-118	Carton (KE-6100/US)
		CHC-068	Carton (KE-6100/CA)
	11.	CHC-067	Contain Box (KE-5100/US)
		CHC-069	Contain Box (KE-6100/US)
	12.		Tag (KE-5100/US, KE-6100/US)
	13.	CAN-294	Seal (These seals are applied only to the model KE-5100/CA.)

11. ELECTRICAL PARTS LIST

NOTE:

When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56×10^{1}*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47×10^{3}*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562×10^{1}*	*RN1/4SR 5 6 2 1 F*

- *For your Parts Stock Control, the fast moving items are indicated with the marks ★ ★ and ★.*
  ★ ★: GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Parts whose parts numbers are omitted are subject to being not supplied.*

Control Unit (CWM-059) (KE-5100) (CWM-058) (KE-6100)

MISCELLANEOUS

Mark	Part No.	Symbol & Description
★★	M5215L	IC1, IC2
★★	PA4007	IC3
★★	LA2101	IC4
★★	LA3370P	IC5
★★	μPC1215V-D or	*IC6
★★	μPC1215V-E or	
★★	μPC1215V-F	
★★	μPB552C	IC7
★★	IR2403	IC8
★★	PD7003	IC9
★★	LVC509	IC10
★★	2SA1048	Q1, Q29
★★	2SC2458	Q2, Q3, Q5, Q12, Q13, Q15, Q25 – Q28, Q30, Q32
★★	2SC2786	Q4, Q6
★★	2SA1016 or	Q7
★★	2SA872A	
★★	2SK49-H2	Q8
★★	2SC2458L	Q9, Q10, Q37, Q38
★★	2SC1545	Q11, Q14
★★	2SA720 or	Q16
★★	2SA673A	
★★	2SC1318 or	Q17
★★	2SC1213A	
★★	2SC1815	Q18, Q35, Q36
★★	2SA790	Q19 – Q24
★★	2SD882	Q31
★★	2SB562	Q33, Q34
★	1S1555 or	D1 – D3, D6 – D10, D15 – D19,
★	1S2076 or	D21 – D29, D34, D35, D36 (KE-5100)
★	1S2473 or	D37 (KE-5100), D39 – D42
★	DS442	
	VACANT	D4
★	KV1235	D5
★	WZ-036	D11
★	XZ-112	D12
★	1S1886	D13, D14
★	WZ-032	D20
★	1S1555 or	D30
★	1S2076	
★	XZ-064	D31
★	MV-11	D32
★	XZ-062	D33
	VACANT	D36 (KE-6100), D37 (KE-6100)
★	MV-104V	D38

CTC-138	T1	IF Tansformer
CTC-137	T2	IF Transformer
CTB-096	T3, T4	Coil
CTB-097	T5	Coil
CTE-092	T6	IF Transformer
CTE-115	T7	IF Transformer
CTB-091	L1	Coil, 4.7μH
CTH-063	L2	Coil, 470μH
CTF-065	L3	Coil, 2.7μH
VACANT	L4	
CTC-057 or	L5, L6	Coil 18 mH
CTC-058		
CTF-101	CF1 – CF3	Ceramic Filter
CTF-100	CF4	Ceramic Filter
CTF-129	CF5	Ceramic Filter

Mark	Part No.	Symbol & Description	
★★	CCP-153	VR1	Semi-fixed, 220 kΩ (B)
★★	C92-626	VR2, VR4	Semi-fixed, 10 kΩ (B)
★★	CCP-144	VR3	Semi-fixed, 6.8 kΩ (B)
	CSS-021 or CSS-022	X1	Crystal Resonator
	CCG-070	TC1 – TC3	Trimmer, 20 pF
★★	CSG-157	S1 (KE-5100)	Switch (Mono, Loud, Clock)
★★	CSG-158	S1 (KE-6100)	Switch (Loud, Dolby NR, 70 μs, Mono, Clock)
★★	CSG-156	S2	Switch (Local)
★★	CSL-023	S7	Switch (Tape/Tuner)
	CWW-092	CR1	(0.01 μF/2.2 kΩ)
	CWW-031	CR2, CR3	(0.01 μF/10 kΩ)
	CWW-086	IB1	Inline Block
	CWW-087	IB2	Inline Block
	CWW-088	IB3	Inline Block
	CWW-089	IB4	Inline Block
	CWW-067	IB5	Inline Block
	CWW-090	IB6	Inline Block
	CWW-091	IB7	Inline Block

RESISTORS

Mark	Part No.	Symbol & Description
	RD1/4VM□□□J	R1 – R9, R11, R12, R15 – R34, R36 – R38, R40 – *R49, R51 – R54, R56 – R59, R67, R68, R71, R74 – R112, R114 – R117, R119 – R123, R125 – R133, R136, R138, R140 – R147
	RD1/4PS□□□J	R10
	RD1/4PM□□□J	R13, R14, R50, R71, R72, R134, R139
	RD1/6PS□□□J	R35, R39, R61 – R66, R69, R70, R137
	RS1/2P□□□K	R118, R124
	VACANT	R113, R135
	VACANT	R55, R60 (KE-5100)
	RD1/4VM□□□J	R55, R60 (KE-6100)

Caution:
IC *IC6 and resistor *R49 used mutually in the following assembly.

IC6	R49
μPC1215V-D	RD1/4VM103J
μPC1215V-E	RD1/4VM153J
μPC1215V-F	RD1/4VM273J

CAPACITORS

Mark	Part No.	Symbol & Description
	CCDSL010C50L	C1
	CEA0R1M50LL	C2, C75
	CEA010M50LL	C3, C23, C53, C70, C96, C105, C106, C127
	CKDBC223M25	C4, C7, C8, C12, C14, C15, C17, C77, C115
	CKDBC103M25	C5, C6, C57, C65, C68, C73, C74
	CKDBC473M25	C9, C58, C60 – C62, C69, C118, C122
	CKDYB222K50L	C11
	CEA100M16LL	C13, C19, C41, C63
	CKDYB102K50L	C10, C16, C20, C76, C82, C116
	CEA3R3M50LL	C18, C125
	CEA100M16NP	C21
	CKDYB101K50L	C22
	CKDSA271J50	C24 – C27
	CKDSA681J50	C28, C29
	CKDSA122J50	C30
	CKDSA680J50	C31
	CKDBB103K50	C32
	CQMA682K50	C33
	CEA470M10L	C34, C59, C71, C81, C88, C117
	CKDYB152K50L	C35, C107, C108
	CKDSA561J50	C36, C37
	CKDSA102J50	C38, C46, C49
	CEA101M10L	C39
	CEA4R7M16NP	C40, C89
	CKDBB223K25	C42, C43, C44
	CEAR22M50LL	C45
	CKDSA101J50	C47, C50
	CEA2R2M50LL	C48, C52
	CQMA472J50	C51, C52
	CQSAH102J50	C55
	CKDBB222K25	C56
	CCDXK130J50L	C64
	CCDVK241J50L	C66
	CCDVK271J50L	C67
	CKDBC563K25	C72
	CEA221M16L	C78, C124
	CEA470M16L	C79, C84
	CCH-059	C80 470 μF/6.3V
	CCDSL100F50L	C83
	CEA221M10L	C85, C92, C102
	CCDCH220J50L	C86
	CCDCH120J50L	C87
	CEA102M6R3L	C90
	VACANT	C91, C94
	CEA4R7M25L	C93
	CEA331M10L	C95
	CEA100M16L	C97, C128
	CKDYF472Z50L	C98, C100, C101
	VACANT	C99
	CEA010M35NP	C103, C104
	CEAR33M50LL	C109, C110
	CEA471M16L	C111
	CEA2R2M50L	C112, C119
	CEAR47M50L	C113
	VACANT	C114, C120, C126
	CEA2R2M25NP	C121
	CCDSL050D50L	C123
	CKDYF103Z50L	C129

Switch P.C. Board

Mark	Part No.	Symbol & Description
★★	CSD-018	S1 Switch (Band, Up/Down, Seek, Memory)

FM Front End Unit (CWB-090)

MISCELLANEOUS

Mark	Part No.	Symbol & Description	
★★	P001	Q1	
★★	2SC2570	Q2	
★★	2SC1675-M or	Q3	
★★	2SC2787-M		
★★	2SC1674 or	Q4	
★★	2SC2786		
★	1SV99	D1	
★	1SV101	D2 – D7	
	CTC-125	T1	
	CCL-068	CG1	Capacitor (with discharge gap)
	CCG-069	TC1, TC2	Trimmer, 10 pF
	CTC-129	L1	Coil
	CTC-126	L2	Coil
	CTC-127	L3	Coil
	CTC-130	L4	Coil
	CTC-128	L5	Coil

RESISTORS

Mark	Part No,	Symbol & Description
	RS1/8S□□□J	R1 – R18, R20, R21 (Chip Resistor)
	RD1/4PM□□□	R19

CHIP CAPACITORS

Mark	Part No.	Symbol & Description
	CKSYB332K50	C1, C3, C4, C9 – C11, C16, C17
	CCSCH030C50	C2
	CCSCHR75C50	C5
	CCSTH120J50	C6
	CCSCH010C50	C7
	CCSCH271J50	C8
	CCSTH080D50	C12, C14
	CCSTH330J50	C13
	CCSTH030C50	C15
	CCSUJ020C50	C18

Switch (CSG-154) (KE-5100)

Mark	Part No.	Symbol & Desciption
★	GL-3Y404D	D1 LED Display
★	BG-4524K	D2 – D4, D6 LED (Green)
★	PR-4524K	D5 LED (Red)

Switch (CSG-155) (KE-6100)

Mark	Part No.	Symbol & Description
★	GL-3Y404D	D1 LED Display
★	BG-4524K	D2 – D4 LED (Green)
★	PR-4524K	D5 LED (Red)
★	PY-4524K	D6 LED (Yellow)

Pre Dolby NR Unit (CWK-237) (KE-6100)

MISCELLANEOUS

Mark	Part No.	Symbol & Description	
★★	MB3106M	IC1	
★★	HA11226	IC2	
★★	2SC2458L	Q1 – Q4	
★★	2SA1048	Q5, Q6	
★	1S2076	D1, D2	
★	1S34	D3, D4	
★	1S1555 or	D5, D6	
★	1S2473VH or		
★	DS442		
★★	CCP-150	VR1, VR2	Semi-fixed, 68 kΩ (B)
★★	CCP-145	VR3	Semi-fixed, 10 kΩ (B)

RESISTORS

Mark	Part No.	Symbol & Description
	RD1/4VM□□□J	R1 – R25, R27 – R46
	RD1/6PS□□□J	R26

CAPACITORS

Mark	Part No.	Symbol & Description
	CKDYB821K50L	C1, C2
	CEANL3R3M25L	C3, C4
	CEA470M10L	C5, C6
	CQMA103J50	C7, C8
	CQMA153J50	C9, C10, C23, C24, C27, C28
	CEA3R3M50LL	C11, C12, C25, C26
	CEA010M35NP	C13, C14
	CEAR33M50LL	C15, C16, C19, C20
	CQMA472J50	C17, C18
	CEA0R1M50LL	C21, C22
	CQMA104J50L	C29, C30
	CEA470M16L	C31, C35
	CEA101M10L	C32
	CEA471M16L	C33
	CEA101M16L	C34

Motor P.W. Board Unit (CWX-322)

Mark	Part No.	Symbol & Description
★★	2SA715WT	Q1
★	1S1886	D1
	RD1/4PS□□□J	R1, R2
	CEA330P16	C1
	CEA100P16	C2

Pre Amp Unit (CWF-080) (KE-5100)

Mark	Part No.	Symbol & Description
★★	MB3106M	IC1
	RS1/8S□□□J	R1 — R11 (Chip Resistor)
	CKSYB561K50	C1, C2 (Chip Capacitor)
	CEANL2R2M50L	C3, C4
	CEA470M10L	C5, C6
	CKSYB103K50	C7, C8 (Chip Capacitor)
	CEA221M16L	C9

Power Amp Unit (CWH-133)

Mark	Part No.	Symbol & Description
★★	HA1398	IC1
★★	2SD655	Q1, Q2
	RD1/4VM□□□J	R1 — R4, R6, R7
	RD1/6PS□□□J	R5

Volume Unit (CWG-095)

Mark	Part No.	Symbol & Description	
★★	CCS-257	VR1/S1	Switch (Tuner Power) Volume, 20 kΩ (B) × 2, 50 kΩ (W), 40Ω × 2 (Tone, Balance, Volume, Fader)
	CEA0R1M50LL	C1, C2	

Miscellaneous Parts List

Mark	Part No.	Symbol & Description	
★★	CPB-057 or	HD1 (KE-5100) Head	
★★	CPB-059		
★★	CPB-050	HD1 (KE-6100) Head	
★★	CXM-046	M	Motor
★★	CSN-060	S1	Switch (FF/REW Muting)